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# The Future of the Army's Civilian Workforce

Comparing Projected Inventory with Anticipated Requirements and Estimating Cost Under Different Personnel Policies

Shanthi Nataraj, Lawrence M. Hanser, Frank Camm, Jessica Yeats

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# Preface

The Army's civilian workforce grew substantially over the past decade, reaching nearly 295,000 full-time employees in fiscal year (FY) 2010. Since then, the size of the civilian workforce has fallen, and the Department of Defense (DoD) has announced plans to scale back the civilian workforce in keeping with the drawdown in military end strength. The goal of this project was to examine likely changes in the supply and demand for Army civilians over the next several years, develop a range of scenarios, and provide insights on where cuts and growth are most likely to take place, explicitly taking the cost of the workforce into consideration.

This document brings together two workforce models to project the size and cost of the Army civilian workforce. The Generating Force–to–Operator (GTO) model estimates the demand for civilians in the institutional Army by the end of FY 2017, based on anticipated allocations to the operational Army from the FY 2014 President's Budget. The RAND Inventory model then projects the supply of Army civilians based on historical employee flow patterns and estimates the numbers of new hires or reductions in force needed to meet civilian demand from the GTO model. The cost of the civilian workforce at the end of FY 2017 is estimated under various assumptions about its pay grade structure. This research will be of interest to workforce planners in the Army and in the broader DoD community, as well as researchers interested in bringing together supply and demand projection models for government civilian workforces.

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# Summary

The U.S. Army's civilian workforce is part of the institutional Army, which supports deployable forces in the operational Army. After reaching a peak of 370,000 civilians in 1987, the Army civilian workforce went through a substantial drawdown during the 1990s. From a size of 220,000 in fiscal year (FY) 2001, the workforce grew until FY 2010. During the past three years, workforce size has once again decreased, reaching approximately 270,000 employees by June 2013 (Figure S.1). Like the other services, the Army civilian workforce will likely shrink further in the next several years, in keeping with guidance from the Department of Defense (DoD) to scale back its civilian workforce.

In this report, we bring together workforce supply and demand projection models to examine how projected supply might be managed to meet projected authorizations by the end of FY 2017. On the supply side, the RAND Inventory Model is a stock-and-flow supply model that projects the number of onboard personnel based on historical

**Figure S.1**
**Historical Army Civilian Workforce Size**
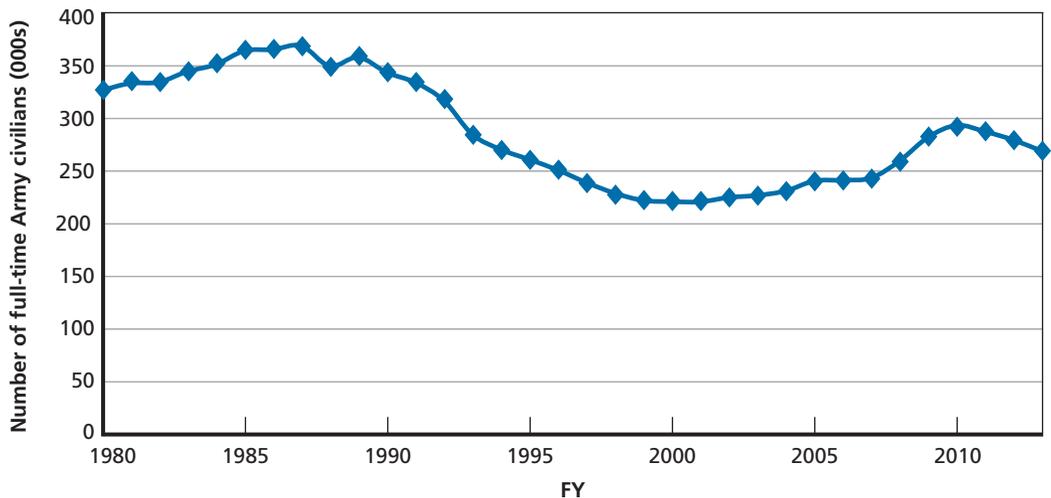


SOURCE: Authors' calculations based on DMDC data.
NOTE: All data are from September of the FY in question, except that the data for FY 2013 are from June.
**RAND** *RR576-S.1*

employee separations, hires, and internal transfers. We used this model to project the number of personnel in the Army civilian workforce through the end of FY 2017 under several scenarios that reflect alternative assumptions about hiring. All projections were performed separately for each command by occupation group. This disaggregation allows us to explore the differences in projected supply at various levels, including commands, occupations, and for the Army civilian workforce as a whole.[1]

We then matched the supply model with a demand model to examine how supply might be managed to meet authorizations. RAND's Generating Force–to–Operator (GTO) model is an input-output model that translates projected budgets for the Army's operating force into projected changes in the supporting activities carried out by the institutional Army, including civilians. The demand projections used in this report were derived by starting with anticipated changes in the operating force through the end of FY 2017 (beginning of FY 2018) based on the FY 2014 President's Budget, then applying the GTO model to estimate resulting changes in the supporting activities carried out by the institutional Army. We applied the projected changes in institutional Army activities to the units performing the activities, then rolled up the projected authorizations to the command by occupation level. Finally, we used the supply model to estimate the number of new hires or the additional reductions that would be required to meet projected authorizations within each command by occupation group.

We selected these two sets of scenarios to show how workforce size might change under a variety of future scenarios. Since the exact nature of the proposed reduction in civilian workforce size is not known, we provide estimates consistent with requirements to reduce hiring by a certain amount, as well as with requirements to meet certain targets.

## From Historical Hiring to a Hiring Freeze

Our first set of scenarios projects the size of the workforce assuming that separation and internal transfer patterns will continue as they have in the past. At one extreme, we assumed that hiring patterns would also continue as they have in the past. At the other extreme, we assumed that a complete hiring freeze would be in place until the end of FY 2017. We also considered intermediate cases in which hiring rates would be 75 percent, 50 percent, and 25 percent of historical rates.

Under historical hiring rates, the RAND Inventory Model projects a 10-percent increase in the workforce between FY 2013 and FY 2017, resulting in a total workforce of approximately 297,000 civilian employees. At the other end of the spectrum, a complete hiring freeze would result in a workforce that is nearly 30 percent smaller (approx-

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[1]  Although the RAND Inventory Model is considered a model of personnel supply, it is based on historical flow rates, which are a product of both supply and demand.

imately 195,000 employees) by FY 2017. Rates of 25 and 50 percent would result in workforce reductions of approximately 20 percent and 10 percent, respectively. With new-hire rates at approximately 75 percent of historical rates, workforce size would remain fairly stable (Figure S.2).

Projected changes vary substantially by command and occupation. Under historical hiring conditions, seven of the ten largest commands (in terms of civilian workforce size) are projected to grow, while three are projected to shrink. Under a hiring freeze, only one of the ten largest commands (Network Enterprise Technology) is projected to grow, because of the high rate of internal transfers into this command. All the other large commands are projected to shrink by 20 to 40 percent by FY 2017. As we would expect, as hiring rates increase from a complete freeze to 25 and 50 percent of historical rates, projected reductions become much less pronounced across all commands and occupations. Consistent with the finding that the overall workforce remains stable when hiring rates are equal to 75 percent of historical rates, five of the top ten commands are projected to grow in this scenario, while another five are projected to shrink. The projected changes to each command size are typically on the order of a few percent.

A similar pattern holds across occupations. Under historical hiring conditions, almost all occupations are projected to grow; a hiring freeze results in 20- to 35-percent cuts to the largest occupations, while the 25- and 50-percent new-hire rates typically result in smaller reductions. With hiring rates at 75 percent of their historical levels, most occupations are fairly stable.

**Figure S.2**
**Total Projected Army Civilian Workforce Supply: From Historical Hiring to a Hiring Freeze**
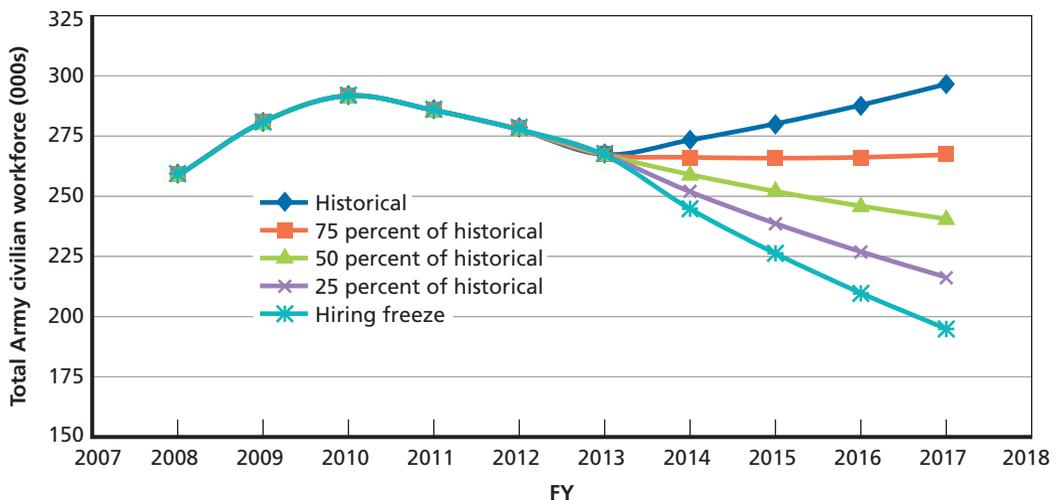


SOURCE: Authors' calculations based on DMDC data and RIM results.
RAND *RR576-S.2*

## Meeting Projected Authorizations

Translating the GTO model projections into required changes in authorizations by command and occupation indicates that the number of onboard personnel would need to fall from approximately 269,000 to 259,000 (a reduction of about 3.5 percent) by the end of FY 2017. We also explored the possibility of meeting target workforce sizes of 240,000; 220,000; and 200,000, distributing changes proportionally according to changes needed to meet the GTO model requirements (Figure S.3).

Under the GTO target scenario, the top ten commands are projected to shrink by a few percent. Achieving smaller workforces requires larger cuts to all the top commands. To reach the smallest target workforce, 200,000, by FY 2017, the top ten commands are each projected to fall by 20 to 30 percent. In all the target scenarios, the largest reductions (in terms of percentage) are seen in the Army Medical Command and the Army National Guard, with the smallest reductions in Army Materiel Command, Acquisition Support, and the Army Corps of Engineers.

The results are fairly similar for occupations. All the top ten occupations are expected to see a reduction of several percent by FY 2017 under the GTO target scenario. Occupations expected to face the greatest projected reductions (in percentage terms) include Medical and Veterinary, Transport Equipment Operations, and Human Resources Management. Similar to commands, under the smallest target workforce size of 200,000 by FY 2017, the top ten occupations are each projected to fall by 20 to 30 percent.

**Figure S.3**
**Total Projected Army Civilian Workforce Supply: Meeting Various Targets**
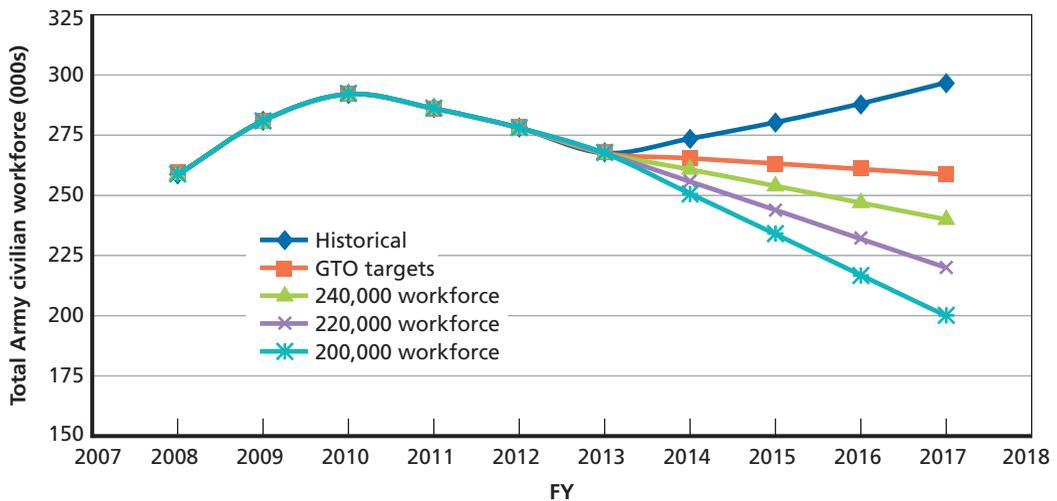


SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.
RAND *RR576-S.3*

Figure S.4 shows the total number of new hires, separations, and additional reductions projected under a selected set of the scenarios. Between FY 2013 and FY 2017, the number of new hires is nearly 120,000 under the historical hiring scenario and decreases with projected FY 2017 workforce size. It is worth noting that, although the scenario with 200,000 civilians by FY 2017 yields a workforce size similar to that of the hiring freeze, approximately 16,000 new hires are still required under the former scenario. The reason is that we aimed to meet the total target while distributing changes proportionally to GTO model changes. Therefore, there are new hires in certain commands and occupations, and reductions in others. This is illustrated by the last set of bars in Figure S.4. Each of the target scenarios requires some additional reductions between FY 2013 and FY 2017, ranging from approximately 1,600 for the GTO target scenario to 8,700 for the target size of 200,000.

In nearly all target scenarios, most additional reductions are concentrated in two commands: Acquisition Support and Network Enterprise Technology. The reason is that these two commands have experienced particularly high rates of internal employee transfers from other commands; therefore, even when we assume that there will be no new hires in these commands, their sizes continue to grow due to internal transfers. This suggests that, in most cases, the required reductions might not be needed if such internal transfers were limited in the future. In the scenario that aims to achieve a workforce size of 200,000 by FY 2017, Materiel Command and the Army Corps of Engineers also require substantial additional reductions, of approximately 2,700 and 1,300, respectively.

**Figure S.4**
**Total Projected Numbers of New Hires, Separations, and Additional Reductions from FY 2013 to FY 2017 Under Selected Scenarios**
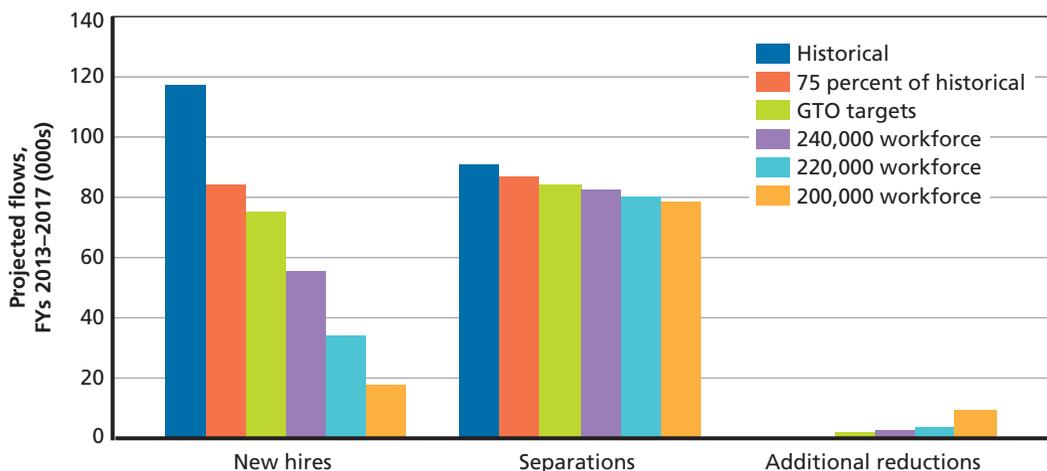


SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.
RAND *RR576-S.4*

## Workforce Costs

For each hiring scenario, we estimated the cost of the Army civilian workforce under different assumptions about its pay structure. First, we assumed that the pay grade structure would remain stable through FY 2017 and that civilian pay raises would occur in line with FY 2014 Green Book assumptions (OUSD, 2013a). We then examined how costs would change if the pay grade structure were to remain stable through FY 2017 but pay were to be frozen within a particular pay grade and pay step. Each of these structures requires management of hiring and promotions to maintain or achieve a certain structure. We therefore assumed that, under a continued hiring freeze, during which promotions would be rare, employees would simply progress through pay steps within a pay grade but would not be promoted.

In FY 2013, the estimated cost of Army civilian personnel to the federal government was $27.5 billion (Table S.1). Since DoD does not bear the entire retirement cost for employees, the estimated total cost to DoD was somewhat smaller, at $25.7 billion. Assuming that historical hiring patterns continue, nominal costs would increase by over 15 percent for both DoD and the federal government as a whole under the first cost scenario (maintaining the pay grade structure and allowing pay raises).[2] This rise is somewhat higher than the 10-percent projected increase in personnel because it also includes the assumed pay raise factors. A hiring rate equal to 75 percent of the historical rate would result in a nominal cost increase of approximately 5 percent, essentially reflecting only the assumed pay raises.

In the scenario in which the GTO target is met, the 3.5 percent reduction in the workforce (to meet a target of approximately 259,000 by FY 2017) is approximately offset by the increase in pay, so that the projected cost to DoD in FY 2017 ($26.0 billion) is nearly the same as the cost in FY 2013 ($25.7 billion). A workforce of 240,000 in FY 2017 can be achieved either through reducing hiring to 50 percent of historical rates or through targeted hiring to meet this workforce size. These two scenarios would reduce DoD's cost by about $1.3 billion (5 percent) and $1.6 billion (6 percent), respectively, relative to FY 2013 levels. Similarly, a workforce of 220,000 in FY 2017 would reduce cost by nearly 15 percent relative to FY 2013 levels.

With a hiring freeze, the projected workforce of 195,000 in FY 2017 would cost DoD $20.7 billion, and the government $21.9 billion. Meeting a workforce size of 200,000 by targeting cuts in proportion to the GTO model requirements would result in a workforce size and cost similar to those for a hiring freeze, although the underlying pay grade structure, as well as the structure of the workforce in terms of command and occupation, would be different.

Even though cost is largely driven by the total number of personnel, it may be possible to use pay or workforce management practices to reduce the cost for a given

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[2]   All cost projections are provided in nominal dollars.

number of personnel. Our second cost scenario—which assumes that the pay grade structure remains stable but that there are no pay raises within a particular pay grade and pay step—would yield an estimated cost savings of approximately $1 billion relative to the baseline cost scenario with pay raises. For example, under the GTO target scenario, the projected cost to DoD with pay raises is $26 billion in FY 2017, while the projected cost without pay raises is approximately $25 billion.

## Summary of Findings

Our findings suggest that meeting future targets will require reducing hiring rates below historical levels but that substantial hiring will still be needed in most commands. A few commands, such as Acquisition Support and Network Enterprise Technology, may require active cuts to personnel or a limitation on internal transfers of other personnel from within the Army civilian workforce. If substantial cuts are sought (to meet a workforce size on the order of 200,000 civilians or below by FY 2017), additional commands are also likely to require reductions in force.

The cost of the workforce will largely change in line with the number of personnel. If GTO targets are met by FY 2017, nominal costs are projected to remain approximately constant, with expected civilian pay raises offsetting workforce reductions. A reduction to 200,000 employees would reduce total nominal cost to the Army by 20 percent, to $20.1 billion by FY 2017. For any given workforce size, costs could be further reduced by approximately $1 billion through continued pay freezes or by limiting promotions and focusing new hires on relatively low pay grades. These potential cost savings should be carefully weighted against the possibility that such policies may encourage the best candidates to leave the Army in search of opportunities in the private sector.

**Table S.1**
**Summary of Projected Civilian Personnel Costs (nominal)**

| | Approximate Workforce Size (000s) | Pay Grade Structure June 2013, Pay Raises from FY 2014 Green Book ($B) | | Pay Grade Structure June 2013, Pay Raise Freeze ($B) | | Pay Grade Structure Resulting from Hiring and Promotion Freeze, Pay Raises from FY 2014 Green Book ($B) | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | DoD | Govt | DoD | Govt | DoD | Govt |
| Cost in FY 2013 | 268 | 25.7 | 27.5 | N/A | N/A | N/A | N/A |
| Projected cost in FY 2017 | | | | | | | |
| Historical hiring | 297 | 30.0 | 31.8 | 28.9 | 30.6 | N/A | N/A |
| 75% of historical hiring | 267 | 27.1 | 28.7 | 26.0 | 27.6 | N/A | N/A |
| 50% of historical hiring | 240 | 24.4 | 25.9 | 23.5 | 24.9 | N/A | N/A |
| 25% of historical hiring | 217 | 22.0 | 23.4 | 21.1 | 22.5 | N/A | N/A |
| Hiring freeze | 195 | N/A | N/A | N/A | N/A | 20.7 | 21.9 |
| Hiring to meet projected authorizations from GTO model | 259 | 26.0 | 27.7 | 25.0 | 26.6 | N/A | N/A |
| Hiring to meet 240,000 end strength | 240 | 24.1 | 25.7 | 23.2 | 24.7 | N/A | N/A |
| Hiring to meet 220,000 end strength | 220 | 22.1 | 23.5 | 21.3 | 22.6 | N/A | N/A |
| Hiring to meet 200,000 end strength | 200 | 20.1 | 21.4 | 19.3 | 20.6 | N/A | N/A |

SOURCE: Authors' calculations based on DMDC data, the results of RIM and GTO, and the cost factors discussed in the text.

## Acknowledgments

# Abbreviations

| | |
|---|---|
| CBO | Congressional Budget Office |
| CSRS | Civil Service Retirement System |
| DCPDS | Defense Civilian Personnel Data System |
| DMDC | Defense Manpower Data Center |
| DoD | Department of Defense |
| DoDI | Department of Defense instruction |
| FEHB | Federal Employees Health Benefits |
| FERS | Federal Employees Retirement System |
| FICA | Federal Insurance Contributions Act |
| FWS | Federal Wage System |
| FY | fiscal year |
| GS | General Schedule |
| GTO | Generating Force–to–Operator |
| IT | information technology |
| MCO | mission-critical occupation |
| MDEP | management decision package |
| NSPS | National Security Personnel System |
| OASDI | Old Age and Survivors Death Insurance |
| OMB | Office of Management and Budget |
| OPM | Office of Personnel Management |

| | |
|---|---|
| OUSD | Office of the Under Secretary of Defense |
| RIF | reduction in force |
| RIM | RAND Inventory Model |
| SES | Senior Executive Service |
| TSP | Thrift Savings Plan |
| UIC | Unit Identification Code |
| WG | wage grade |
| WL | wage leader |
| WS | wage supervisor |
| YORE | years relative to retirement eligibility |
| YOS | years of service |

# Introduction

The U.S. Army's civilian workforce is part of the institutional Army, which supports deployable forces in the operational Army. Over the past decade, the Army has transferred as many military billets as possible from the institutional Army to the operating force to support extended deployments. Although the number of civilian personnel in the Army rose between fiscal year (FY) 2001 and FY 2010, it has since fallen by approximately 8 percent.

The Department of Defense (DoD) has announced plans to scale back its civilian workforce by 5 to 6 percent over the next five years (Carter, 2013). The specific manner in which these civilian workforce reductions will be applied—whether through base closures, natural attrition, early retirement incentives, or hiring freezes—has not been determined.

We used the RAND Inventory Model (RIM) to project the number of personnel in the Army civilian workforce through the end of FY 2017 under several scenarios. First, we projected the size of the workforce assuming that attrition patterns will continue as they have in the past, while hiring ranges from its historical average to a complete hiring freeze. Next, we estimated what hiring levels would be needed to match the changes in authorizations projected by the Generating Force–to–Operator (GTO) model, which examines how changes to the operational Army affect authorizations in the institutional Army. Finally, we estimated the hiring levels required to meet a variety of lower targets. For each hiring scenario, we estimated the cost of the Army civilian workforce assuming that (1) the pay grade structure remains stable through FY 2017, and civilian pay raises occur in line with FY 2014 Green Book assumptions; (2) the pay grade structure remains stable through FY 2017, but pay is frozen within a particular pay grade and pay step; and (3) the pay grade structure is shifted toward lower pay grades, in accordance with the structure in place in FY 2005, prior to the adoption of the National Security Personnel System (NSPS).

The rest of this report is organized as follows. Chapter Two briefly summarizes the methodology used to project the size of the Army civilian workforce and to estimate the associated costs. Chapter Three provides some descriptive analyses of historical trends in hiring and separation for Army civilians, as well as a detailed analysis of mission-critical occupations (MCO). Chapter Four presents projected workforce sizes

under each scenario, and Chapter Five summarizes the potential implications for the cost of the civilian workforce and for civilian policy. A series of appendixes provide additional details on the modeling and cost projections, the analysis of mission-critical occupations, and further results.

# Methodology

This chapter summarizes the methods we used to project the inventory of civilian personnel from FY 2014 to FY 2017. We also discuss the assumptions we used when estimating the costs associated with these personnel.

## Data

The supply projections are based on civilian personnel inventory data from the DoD Civilian Personnel Data System (DCPDS) files maintained by the Defense Manpower Data Center (DMDC). These data files provide a rich set of information about personnel, including unit identification code (UIC), pay grade, occupation, years of service (YOS), and demographic characteristics.

Our analyses are based on the population of full-time Army civilians from FY 2004 through FY 2013.[1] Because of data availability, we projected employee flow rates based on historical changes from the end of one FY to the next (i.e., data from September of each year). However, we applied the projections to the personnel counts from June 2013 because these are the most recent available. We will refer to the June 2013 data as FY 2013 data. Our historical flow rates are based on 12-month periods (through September FY 2012), to avoid estimating a flow rate based on only nine months of data (from FY 2013).

Due to the lack of available data, our projections do not include contractors. To some extent, the observed historical patterns in civilian personnel levels may be driven by substitution between civilian and contractor personnel. Unfortunately, we are unaware of a consistent source of historical contractor data from which we can draw.

Our projections are based on all full-time Army civilians, with two exceptions. First, for approximately 700 civilians, we were unable to match the reported UIC codes to command codes. We therefore excluded these civilians from our analyses. Second,

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[1]  We define *full-time civilians* as those working 40 hours or more. Note that this is not the same as the concept of *full-time equivalents*, which converts part-time workers into an "equivalent" number of full-time workers. As of June 2013, over 98 percent of Army civilians were full-time workers.

out of the 38 commands to which the personnel were matched, eight had fewer than 250 people in FY 2013. We also excluded these eight commands, which accounted for less than 0.5 percent of Army civilians in FY 2013, from our analyses.

## Personnel Projections

To project the future inventory of civilian Army personnel, we used RIM, a stock-and-flow supply projection model that has been previously applied to a variety of civilian personnel populations. It was originally developed to support supply projections for the acquisition workforce (Emmerichs, Marcum, and Robbert, 2004). Currently, the model provides ongoing projections of workforce supply for the acquisition workforce and for a number of MCOs within DoD, including estimates of the number of new hires (or forced separations) required to meet target workforce levels. Below, we provide an overview of the model; further details are provided in Appendix A and can also be found in previous RAND reports (Gates et al., 2008; Gates et al., 2013).

Our primary unit of analysis is the command by occupation; for example, we project the number of Army civilians in Army Materiel Command who are classified as information technology (IT) personnel. In presenting the results, we roll them up to the command or the occupation level.

The starting point for the projection is the most recent count of onboard personnel, which is from FY 2013 (June). We count the number of personnel by years relative to retirement eligibility (YORE).[2] YORE represents the number of years that an employee has been eligible for retirement. For example, YORE 0 identifies individuals who are not yet eligible for retirement but who will become eligible within the next FY; YORE –1 identifies individuals with at least one but less than two full FYs ahead of them before reaching full retirement eligibility; and YORE +1 identifies individuals who have become retirement eligible in a given FY but have not yet retired by the end of the FY.

The supply projection model is based on personnel counts by YORE because retirement eligibility is one of the strongest predictors of separation. As we show in Chapter Three, retirement rates fall as employees near retirement eligibility, then jump and remain high as soon as employees become retirement eligible.

Employee flow rates differ not only by YORE but also by retirement plan (see Gates et al., 2008). Therefore, we projected the population separately for workers in three retirement plan types: the Civil Service Retirement System (CSRS), the Federal

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[2]  The YORE variable was derived by calculating the earliest age at which each individual could claim regular, full retirement benefits under the assumption that they work continuously until that future retirement eligibility date and remain covered under their current retirement plan. The age at which one can retire with full, regular benefits depends on retirement plan, age, YOS, and minimum retirement age as described by the Office of Personnel Management (OPM).

Employees Retirement System (FERS), and other plans. We then added up the three sets of projections to arrive at a total for the command by occupation.

Starting with the stock of onboard employees in FY 2013, the model changes this stock in each subsequent year based on various flows of employees into, out of, and within the organization. We calculated the following flow rates based on flows between the end of one FY and the next, over a five-year historical period:

- *separation rate*—the fraction of employees in the YORE who are projected to leave the Army
- *switch-out rate*—the fraction of employees in the YORE who are projected to leave the command by occupation under consideration but to move to another command by occupation within the Army
- *new-hire rate*—the number of employees who are expected to join the Army in that YORE, as a fraction of the number of employees in that YORE at the end of the previous year
- *switch-in rate*—the number of employees who are expected to move from another command by occupation within the Army to the command by occupation under consideration in that YORE, as a fraction of the number of employees in that YORE at the end of the previous year.

RIM typically calculates flow rates based on the previous five years of historical data. Using historical flow rates imposes the assumption that such flow rates will continue into the future. As we discuss in more detail later, we conducted a set of exercises in which we varied the new-hire rate. However, in all scenarios, we assumed that the historical separation, switch-in, and switch-out rates would hold. Thus, to the extent that a command or occupation we considered has exhibited a particularly high or low separation or switching rate over the past several years, our projections will assume that the next several years will exhibit a similarly high or low rate. RIM does have the ability to allow users to assume different separation, switch-in, and switch-out rates. However, in this research, we focused on manipulating new-hire rates because this policy lever is the one Army civilian managers can control most easily.

We mitigated any concern about unusual historical rates to some extent by using a five-year historical period, which smooths out any anomalous patterns that might be present during a particular year. In addition, as we show in Chapter Three, historical new-hire rates for Army civilians were particularly high in FYs 2008 and 2009, while switching rates were particularly high in FY 2007; such rates are unlikely to be repeated in the near future. Therefore, we calculated historical rates based on the period from FY 2005 through FY 2012, excluding FY 2007 through FY 2009.

In assuming that historical trends continue into the future, RIM also implicitly assumes that macroeconomic conditions that might influence separation patterns (e.g., the unemployment rate) will continue into the future. The projections are thus based

on the notion that individuals will continue to separate (and transfer within the Army) as they have done over the past several years.

Finally, we note that, although RIM is considered a model of personnel supply, it is based on historical flow rates. These rates, in turn, have been driven by both supply and demand. For example, high new-hire rates in a previous year may have been due to increased requirements, or high separation rates may have been due to early retirement policies triggered by decreased demand.

## Projections by Command and Occupation

To place each individual in the appropriate command by occupation group, we mapped each UIC to a command based on the UIC descriptions provided in the Army's Force Management System website. The DCPDS data also provide a six-digit OPM occupation code for each civilian. We classified civilians into occupations at the four-digit level (for example, 2210 is the IT Management series).

Stock-and-flow models are best suited to populations of at least 100 employees (Edwards, 1983). When there are fewer than 100 employees, which is the case in many of these command by occupation groups, the estimated worker flow rates can exhibit substantial volatility and create implausible results. Therefore, we calculated historical rates for new hires, separations, and switches in and out at two levels: based on the command as a whole and based on the occupation as a whole. For example, to project rates for the IT workforce in Army Materiel Command, we calculated rates based on (1) all personnel in Army Materiel Command and (2) all personnel in IT. The two sets of rates yield largely similar projections, so for the sake of brevity, we only present the results using command-level rates in Chapter Four.

## Matching Personnel and Requirements Projections

RAND's GTO model is an input-output model that translates projected changes in the Army's operating force into projected changes in the supporting activities carried out by the institutional Army. The GTO model results used in this report are based on the President's Budget for FY 2014.[3] Each activity in the GTO model is associated with a number of management decision packages (MDEPs) from the budget. The budget is used to calculate the changes in authorizations for each MDEP between FY 2014 and FY 2018. These changes are applied to the MDEPs associated with external demands on the institutional Army—those that come from outside the institutional Army. These

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[3]  Data from the FY 2014 President's Budget, provided to RAND Arroyo Center by the Office of the Deputy Chief of Staff, G-8, at the program element level.

changes in external demand in turn drive changes in the institutional Army through the input-output relationships developed in the GTO model. This results in an anticipated percentage change in authorizations associated with each GTO activity.[4]

We applied the percentage change for each activity to its associated UICs. We assumed that the percentage change for the activity as a whole applied to the number of civilians performing that activity. For example, if the GTO model projected a 5-percent reduction in training support, all UICs associated with providing training support were assumed to decrease by 5 percent. If 1,000 Army civilians were in the units associated with training support in FY 2013, we assumed that only 950 civilians would be required by the end of FY 2017 (a 5-percent reduction). We also assumed that each UIC would maintain the same occupational mix as it had in FY 2013. Finally, we rolled up the projected authorizations to the command by occupation level and compared them with projected supply.

The GTO model projects a steady state at the end of FY 2017 (start of FY 2018) and does not specify how that steady state is reached. In contrast, RIM projects the size of the workforce from year to year. To make the GTO requirements compatible with RIM, we assumed that the percentage changes the GTO model projected for the end of FY 2017 would be evenly spread over the intervening years. In the example above, the projected reduction of 50 Army civilians from units associated with training would be split evenly over the four years from FY 2014 to FY 2017, resulting in a required workforce size reduction of 12–13 employees every year.

Two data-related issues deserve a brief discussion. The personnel projections used civilian personnel on hand in June 2013, from DMDC, as a starting point, while the GTO model used civilian authorizations from FY 2014. These two data sources yielded similar civilian counts in most commands, with two exceptions. First, the personnel data from DMDC indicate that there are approximately 34,000 civilians in the Army Corps of Engineers. In contrast, the GTO model data sources report fewer than 10,000 civilians in this command. The likely reason for this discrepancy is that the President's Budget classifies many of these civilians as part of the Civil Works budget rather than the DoD budget. Regardless of how they are paid, they are Army civilian personnel; therefore, we included them in our supply projections. We applied the percentage reductions projected for the Corps of Engineers units from the GTO model to all Corps of Engineers civilians.

Second, the DMDC data identify approximately 32,000 civilians in the Army National Guard and fewer than 1,000 in the Headquarters National Guard Bureau.

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[4]  We also explored an alternative approach that simply allocates the anticipated changes, by MDEP, from the FY 2014 President's Budget to each activity in the GTO model, regardless of whether the activity is considered to be an external or an internal demand. In this case, we did not translate the external demands on the institutional Army into projected requirements using the modeled input-output linkages; rather, we applied the President's Budget allocations directly to all activities. The results are quite similar to our findings using the GTO model. Appendix D summarizes some of the key findings from this approach.

In contrast, the GTO data indicate that there are approximately 30,000 civilians in the Headquarters National Guard Bureau but none in the Army National Guard. The discrepancy is likely due to the fact that civilians in the Army National Guard are also reservists. We therefore combined these commands into one "National Guard" command.

## Cost Projections

To estimate the cost of the workforce, we first calculated the direct cost of full-time civilian personnel, by pay plan and pay grade, for each of the five major pay plans: General Schedule (GS), Senior Executive Service (SES), and the three main Federal Wage System (FWS) plans (WG, WL, and WS). DoD Instruction (DoDI) 7041.04 provides guidance on estimating the cost of a civilian employee, to DoD and to the federal government as a whole. We estimated the cost DoD bears (which we assumed to be equal to the cost the Army bears), by adding up the following cost elements:

- base pay and locality pay
- special pays
- fringe benefits
- severance pays
- training costs.

We then estimated the total cost the federal government bears, which includes the items above, plus the following cost elements:

- postretirement health benefits
- postretirement life insurance benefits
- unfunded retirement benefits.

We calculated average base pay for full-time employees, by pay plan and pay grade, using DMDC data. We adjusted average pay for GS employees to account for cost-of-living adjustments (known as locality pay). The remaining cost elements differ, to some extent, based on the employee's retirement plan. Most cost elements apply to both CSRS and FERS employees, but the federal government faces an additional, unfunded retirement benefit cost element for CSRS employees. For employees not covered by the CSRS or FERS retirement plans, we followed guidance on public-private competition costs from the Office of Management and Budget (OMB) (Circular A-76) and assumed that the only applicable cost elements are Old Age and Survivors Death Insurance (OASDI) and Medicare benefits. The applicable cost elements are summarized in Table 2.1; Appendix B provides further details.

**Table 2.1**
**Method for Calculating Cost of a Full-Time Civilian Employee**

|  | Cost Element | Applicability |
|---|---|---|
| Cost to DoD (Army) | | |
| Base pay | Average calculated from DMDC data, by pay plan and pay grade | All full-time employees |
| Locality pay | 19.85% | GS employees |
| Special pay (OC11 load factor) | 5.5% | CSRS/FERS employees |
| Fringe benefits (OC12 load factor) | 30.6% | CSRS/FERS employees |
| Medicare/retirement benefits only | 1.45% (Medicare) 6.2% (retirement) | Non-CSRS/FERS employees |
| Severance/separation benefits (OC13 load factor) | 1.6% | CSRS/FERS employees |
| Training | $819 | CSRS/FERS employees |
| Additional costs to federal government | | |
| Postretirement health benefit | $5,801 | CSRS/FERS employees |
| Postretirement life insurance benefit | $24 | CSRS/FERS employees |
| Unfunded civilian retirement | $11,752 | CSRS employees |

SOURCE: Authors' calculations based on various sources discussed in Appendix B.

NOTE: The locality pay percentage is applied to base pay for GS employees; all other percentages are applied to the sum of base plus locality pay. Dollar amounts are per-employee costs.

## Scenarios Considered

We projected the size and cost of the Army civilian workforce under several scenarios about hiring rates and pay grade structures. In each case, we assumed that separation rates, as well as transfer rates between command by occupation groups, would remain the same as in the past.

### New-Hire Scenarios

We considered two sets of new-hire scenarios. The first set varies the new-hire rate (the number of new hires as a percentage of the current workforce) between two potential extremes. On the high end, we assumed that new hiring would continue as it has in the past. On the low end, we assumed a complete hiring freeze. These two scenarios should be viewed as representing upper and lower bounds for the size of the civilian workforce. We then estimated workforce size under three more scenarios between these two extremes: assuming that the new-hire rate will be equal to 25 percent, 50 percent, and 75 percent of the historical rate.

In the second set of new-hire scenarios, we aimed to match projected personnel with projected authorizations. We first projected the number of new hires needed to meet the targets from the GTO model. If the projected supply of personnel was greater than projected authorizations (within a particular command by occupation), even with no new hires, we assumed that there would be additional, forced separations. The GTO model projected a requirement for nearly 260,000 civilians by the end of FY 2017. We also considered the numbers of new hires and/or additional reductions that would be needed to meet target workforce sizes of 200,000; 220,000; and 240,000 civilians. To preserve the structure of the projected workforce given these lower targets, we assumed that changes in workforce requirements were proportional to those the GTO model projected, at the command by occupation level.

We selected these two sets of scenarios to illustrate how workforce size might change under a variety of different hiring circumstances. Since the exact nature of the proposed reduction in civilian workforce size is not known, we attempted to provide estimates consistent with requirements to reduce hiring by a certain amount relative to historical levels, as well as with requirements to meet certain targets.

**Cost Scenarios**

RIM projects the structure of the workforce by YORE, as employees naturally "age" from one YORE to the next each year. However, the model does not project the movement of employees from one pay grade to the next, because the civilian pay grade structure is managed, and civilians are promoted only when a position is available in the next pay grade.

Therefore, for most of the hiring scenarios, we estimated the cost of the workforce under three different cost scenarios.[5] First, we assumed that hiring and promotions would be managed to maintain the same pay grade structure that was in place in FY 2013. Suppose, for example, that the workforce in a command by occupation was 100 in FY 2013 and was projected to increase to 120 by the end of FY 2017. If 10 percent of the workforce (10 employees) was in GS-02 in FY 2013, we assumed that 10 percent of the projected workforce (12 employees) would be in GS-02 in FY 2017.

This assumption does not mean that individual employees cannot progress to higher pay grades or pay steps. As we show in Chapter Three, nearly 10 percent of Army civilians separate every year, and a large share of the workforce in higher grades is retirement eligible. This means that, in any given year, a substantial number of positions, concentrated in high grades, will become vacant and can be filled through promotions and hiring. This continuous process of separations, promotions, and new hires means that individual employees can progress through the system even as the overall pay grade and pay step structure is maintained.

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[5]   The cost of the workforce under the hiring freeze is calculated differently, as we discuss in more detail later.

To inflate pay over time in this baseline scenario, we assumed that, within a particular pay grade, average pay would increase in line with the following civilian pay raise factors from Tables 5-2 and 5-3 of the FY 2014 Green Book (OUSD, 2013a):[6]

- FY 2014: 1.0 percent
- FY 2015: 0.5 percent
- FY 2016: 1.0 percent
- FY 2017: 1.5 percent.

Our second cost scenario was the same as the first, except that we assumed these pay raises would not occur, that is, that there would be pay freezes through the end of FY 2017. The pay freeze scenario did not assume that *individual* employees would not receive pay raises; rather, we assumed that there would be no *statutory* increases in published pay for a given pay grade and pay step. This assumption, coupled with the assumption that managers could maintain the FY 2013 pay grade and pay step structure, meant that the average pay we estimated for each grade did not change over time.

In our third cost scenario, we examined what would happen to costs if the pay grade structure were returned to the distribution seen in prior years. At the end of FY 2012, GS and SES employees accounted for approximately 70 percent of the Army civilian workforce. Wage-grade (WG) employees accounted for another 15 percent, while wage-leader (WL) and wage-supervisor (WS) employees each made up approximately 1 percent of the workforce.

The share of Army civilian employees in the WG, WL, and WS pay plans has fallen over time, from 23 percent in FY 1990 to 16 percent in FY 2012 (Figure 2.1). The share of employees in the GS and SES pay plans has remained steady, at approximately 70 percent, except between FY 2006 and FY 2011. During this time, a number of GS employees were shifted into NSPS. The program ended in 2009, and all employees were shifted back to their former pay plans by FY 2012.

Although the share of GS employees in the total civilian workforce has remained stable from FY 1990 to FY 2012, employment within the GS pay plans has shifted steadily toward higher grades (Figure 2.2). In FY 1990, approximately 50 percent of GS employees were in pay grades GS-08 or above. By FY 2012, 72 percent of GS employees were in these pay grades. The dip between FY 2006 and FY 2009 was caused by the introduction and subsequent recall of the NSPS. The share of WG employees has similarly shifted toward higher grades.

We therefore estimated cost in the third scenario assuming that, as employees separate, promotions and new hires will be managed so that the pay grade (and pay

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[6]   During the same period, the Congressional Budget Office (CBO) projects that the fourth-quarter-to-fourth-quarter change in the consumer price index will be 2.0 percent for 2014, and 2.2 percent for 2015 through 2018 (CBO, 2013). Adjusted civilian pay raise factors are therefore below the expected rise in the consumer price index throughout this period.

**Figure 2.1**
**Distribution of Employees by Pay Plan**
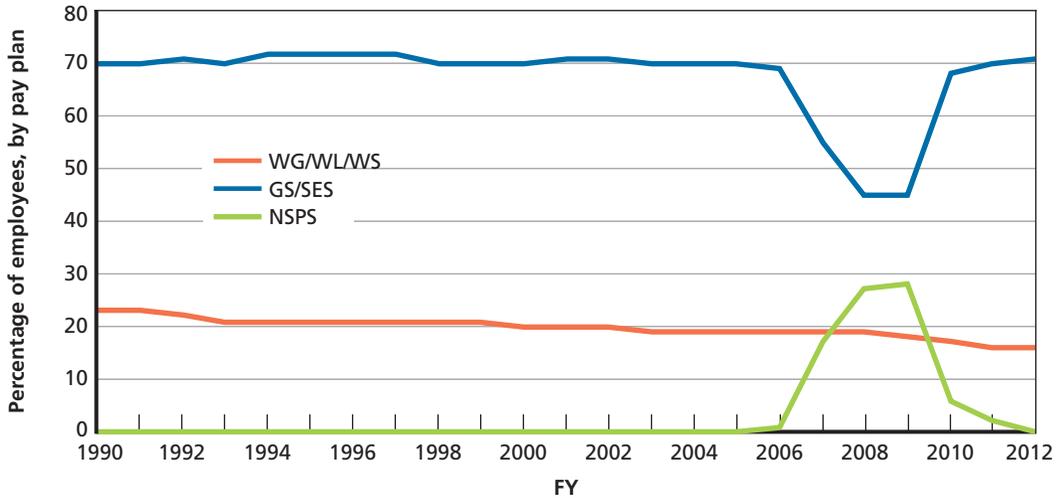


SOURCE: Authors' calculations based on DMDC data.
NOTE: Only full-time employees in the five major pay plans (GS, SES, WG, WL, WS) and NSPS are included.
**RAND** *RR576-2.1*

**Figure 2.2**
**Share of GS and WG Employees in Grades 8 and Above over Time**
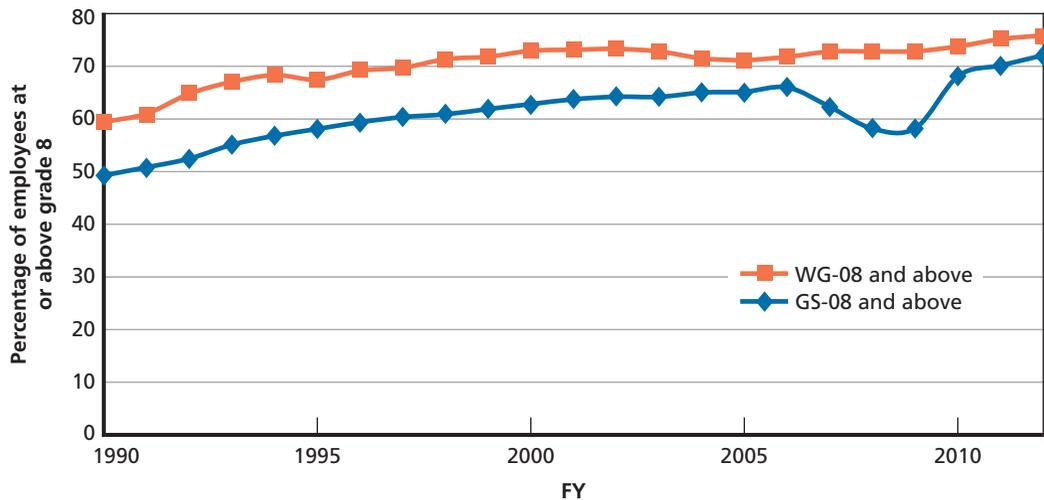


SOURCE: Authors' calculations based on DMDC data.
**RAND** *RR576-2.2*

step) structure in FY 2017 approximates the structure at the end of FY 2005. We selected FY 2005 to avoid including changes in the distribution of pay grades caused by the NSPS. In this cost scenario, average civilian pay within each pay plan and pay grade is assumed to start at FY 2013 levels and increase in line with FY 2014 Green

Book assumptions. We recognize that this scenario may be less feasible to implement than a continued pay freeze and we carried out the exercise to identify the potential cost savings. The third cost scenario yielded virtually the same cost as the second scenario; thus, we do not present the results separately.

We did not apply any of these cost scenarios when assuming a hiring freeze. During a complete hiring freeze, promotions are typically not allowed.[7] Therefore, managers would not be able to achieve a desired pay grade structure. Rather, employees would progress through pay steps within a pay grade but could not be promoted to the next pay grade. We estimated the effect on the grade structure, and the resulting cost, as follows. First, we started with a count of civilian employees in each pay grade and pay step in FY 2013.[8] Next, we distributed the projected total number of separations across pay grades in accordance with historical separation patterns. We then moved the remaining employees up in terms of pay step, in accordance with OPM guidelines. For example, an employee who was in pay step 1 in the GS pay plan in FY 2013 was moved to pay step 4 by FY 2017.[9] Finally, we applied the average pay for employees in each pay grade and pay step to the projected number of employees.

As noted above, we assumed that current separation patterns would continue under these three cost scenarios. In reality, separation rates may increase under the second and third scenarios because a pay freeze or lower pay grade structure may mean that government pay falls relative to private-sector pay for similar occupations. On the other hand, if the pay freeze goes along with fewer opportunities in the private defense sector, separation rates may decrease. Explicitly accounting for how pay policy changes influence retention behavior was beyond the scope of the current effort. Nonetheless, we can qualitatively consider how higher separation rates would affect our estimates. Under the first set of new-hire scenarios (without targets), the total size of the workforce at the end of FY 2017 would be lower than is currently projected. Under the second set of new-hire scenarios (with targets), a greater number of new hires would be needed to offset higher separation rates. If separation rates are differentially affected across occupations, commands, or pay grades, new hires would also need to be distributed differently.

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[7]   There are exceptions, such as when a case can be made that a person's position should be upgraded. This is referred to as an *accretion*.

[8]   We performed this analysis for Army civilians as a whole, rather than by command by occupation, to avoid small cell size issues.

[9]   We applied the following waiting periods: for GS employees, one year for advancement to steps 2, 3, and 4; two years for advancement to steps 5, 6, and 7; and three years for advancement to steps 8, 9, and 10; for FWS employees, the waiting period was one-half year for advancement to step 2, one-and-one-half years for advancement to step 3; 2 years for advancement to steps 4 and 5. These waiting periods are based on guidance from OPM (undated) and the U.S. Army Civilian Human Resources Agency (2012).

**Cost of a Reduction in Force**

The second set of new-hire scenarios requires meeting projected targets. In the event that a hiring freeze does not reduce workforce size sufficiently to meet targets within a particular command by occupation, forced separations are assumed. We therefore constructed a ballpark estimate of the severance pay associated with such a reduction in force (RIF).

Using OPM guidance, we estimated the severance pay due to any employee who is part of a RIF. Since severance pay depends on YOS and age, while the supply projection model classifies employees by YORE, we used data from FY 2013 to calculate the average salary, YOS, and age of an employee in each of six broad YORE bins: YORE –21 or less, YORE –20 to –11, YORE –10 to –6, YORE –5 to –1, YORE 0 to 4, and YORE 5 and above. We then applied OPM's formula to estimate the average, per-employee cost of a RIF for an employee in each YORE bin.[10] DoD also pays for 18 months of health benefits for an employee who is part of a RIF, so we included an estimate of this cost.[11] Appendix B shows the average pay, as well as estimated per-employee severance and health benefits costs, for each YORE bin.

We applied this per-employee cost by YORE bin to the reductions the supply model projected. In doing so, we assumed that force reductions would be equally distributed across YORE. For example, if 20 percent of employees in FY 2013 had YOREs between 0 and 4, 20 percent of any force reductions were applied to workers with these YOREs. This allowed us to estimate the total number of reductions for employees in each YORE bin in each year between FY 2014 and FY 2017. Multiplying the number of employees involved in a RIF by the per-employee cost of a RIF produced a total estimated RIF cost.

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[10] The basic formula provides one week's salary for every YOS up to ten YOS, and two weeks' salary for every YOS beyond ten YOS. There is also an adjustment factor for employees aged 40 and above. The maximum severance pay is equal to one year's salary.

[11] The cost method described above does not break out health benefits separately from other fringe benefits; therefore, we used a cost factor of 6.8 percent, based on OMB A-76 guidance.

# Descriptive Analyses

This chapter presents some descriptive analyses of the Army civilian workforce based on DMDC data. We begin by examining changes in overall workforce size, as well as separations and new hires, during the past 30 years. We also analyze the retirement eligibility of the workforce, including a comparison of workforce age with the private sector. Finally, we focus on separation patterns and retirement eligibility for MCOs.

Many of the analyses in this chapter rely on a comparison of employee flows over time. Prior to FY 2006, we have end-of-FY (September) data, but no data for the other quarters (March, June, December). Therefore, this chapter focuses largely on the September data through FY 2012.

## Historical Workforce Patterns

The number of full-time Army civilians grew slightly or remained stable during the 1980s, then fell sharply from a high of nearly 370,000 in 1987 to a low of just over 220,000 by FY 2001, in line with the broader DoD drawdown of the 1990s (Figure 3.1). Following 2001, the number of Army civilians rose steadily to 244,000 in FY 2007, then rapidly increased by nearly 20 percent, to 294,000, between FY 2007 and FY 2010. The number of civilians has since fallen, reaching approximately 270,000 by June 2013.[1]

During this 30-year period, the average separation rate (the number of separations in an FY, as a percentage of the workforce size at the end of the previous FY) has fluctuated between approximately 7 and 12 percent (Figure 3.2). This means that, in any given year, between 7 and 12 out of every 100 workers leave the Army civilian workforce. This includes retirements, voluntary and involuntary separations, and transfers to other DoD or government agencies.

In contrast, the new-hire rate (the number of new hires in an FY, as a percentage of the workforce size at the end of the previous FY) has changed more substantially

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[1]   The total number of Army civilian employees, including part-time as well as full-time workers, was about 273,000 at the end of FY 2012.

**Figure 3.1**
**Historical Army Civilian Workforce Size**
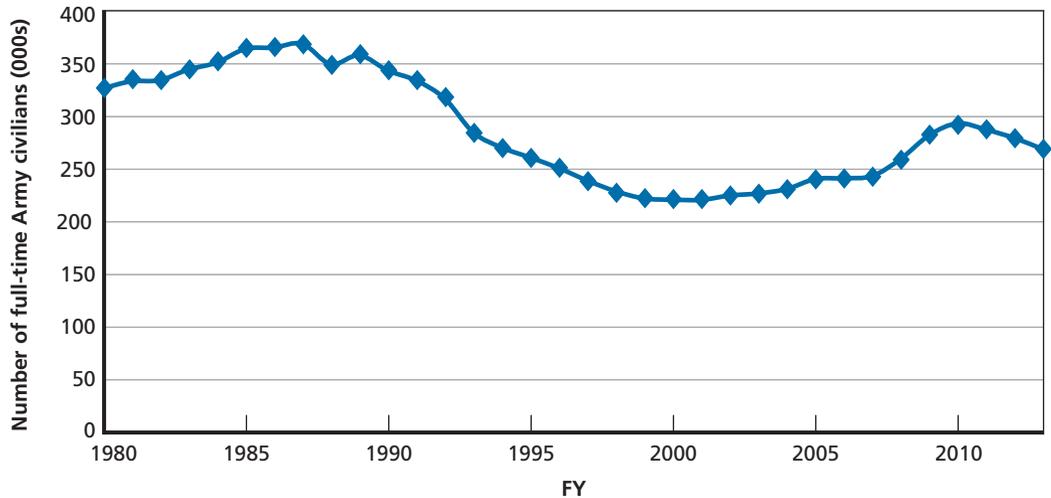


SOURCE: Authors' calculations based on DMDC data.
NOTE: Data are from September of each FY, with the exception of FY 2013, for which data are from June.
**RAND** *RR576-3.1*

**Figure 3.2**
**Historical Annual Separations and New Hires**
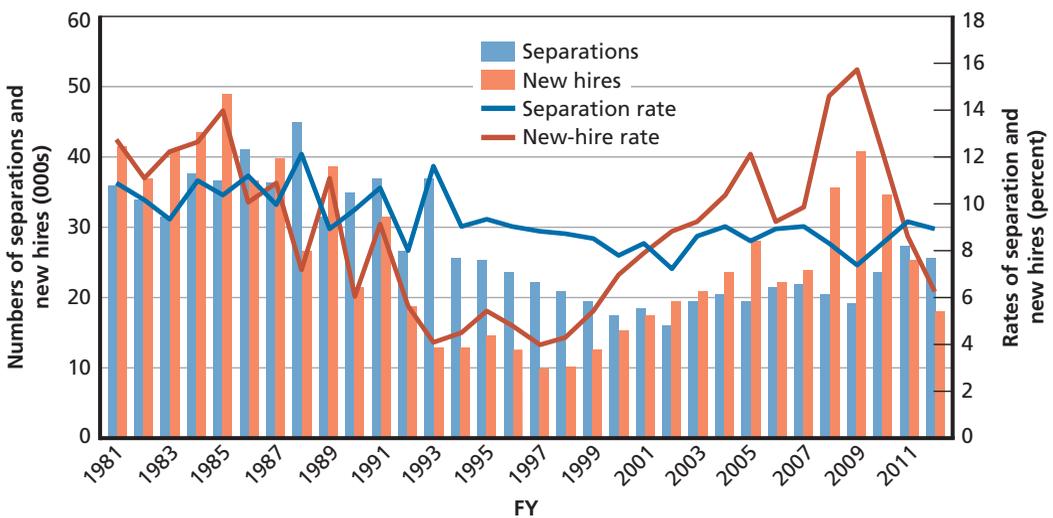


SOURCE: Authors' calculations based on DMDC data.
NOTE: The annual separation and new-hire rates are calculated by taking the number of separations or new hires during the FY divided by the number of Army civilians at the end of the previous FY.
**RAND** *RR576-3.2*

over time. The new-hire rate was approximately equal to the separation rate (11 to 12 percent) during the 1980s, consistent with a stable workforce size. During the draw-

down of the 1990s, the new-hire rate dropped to 5 percent; it began to climb steadily during the late 1990s and generally continued on an upward trend through FY 2009.

Particularly high new-hire rates of 15 to 16 percent were seen in FYs 2008 and 2009. One potential reason for this spike in hiring may have been the base closures and relocations during this time. If a number of civilians chose not to relocate, we would expect a substantially higher number of separations and new hires during that time because the relocated positions would have been filled with new personnel. However, there is no corresponding spike in the separation rate around the same time. Therefore, another possibility is that this spike in new hires represents contractor insourcing initiatives from around that period (Manuel and Maskell, 2013). It could also be that, as military personnel were moved from the institutional Army to the operational Army, new civilians were hired to replace them.

Nonetheless, it appears unlikely that the particularly high new-hire rates witnessed in FY 2008 and FY 2009 will be repeated in the near future. Moreover, although not shown here, the number of internal transfers between commands was particularly high in FY 2007. Therefore, as discussed in Chapter Two, we project forward historical rates based on the period from FY 2005 through FY 2012, excluding FY 2007 through FY 2009.

There has been speculation that recent furloughs and pay freezes may have triggered retirements or otherwise changed civilian patterns. We examined quarterly separation and hiring rates over the past five years, calculating the quarterly rate as the number of separations or new hires during a particular quarter, divided by the number of civilians at the end of the previous quarter.[2] Figure 3.3 illustrates that the quarterly separation rate has remained fairly stable over time, at approximately 3 percent per quarter. There is some seasonality in both separation and hiring rates, which tend to peak during the last quarter of each FY. The only exception is the fourth quarter of FY 2011, when the quarterly separation rate rose to 5.9 percent. However, since that quarter, the separation rate has returned to its previous average. As we would expect, the new-hire rate has trended down since FY 2009.

## Retirement Eligibility

One potential concern that arises because of the low new-hire rates of the 1990s is that a substantial fraction of the Army civilian workforce is approaching retirement eligibility (Figure 3.4). Approximately 14 percent of the Army civilian workforce is currently retirement eligible, and another 16 percent is within five years of retirement eligibility.

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[2]  Quarterly separation and new hire rates may be higher than annual rates because employees who join the workforce and subsequently separate within a FY will be included in the quarterly rates but not the annual rates.

**Figure 3.3**
**Recent Quarterly Separation and New-Hire Rates**
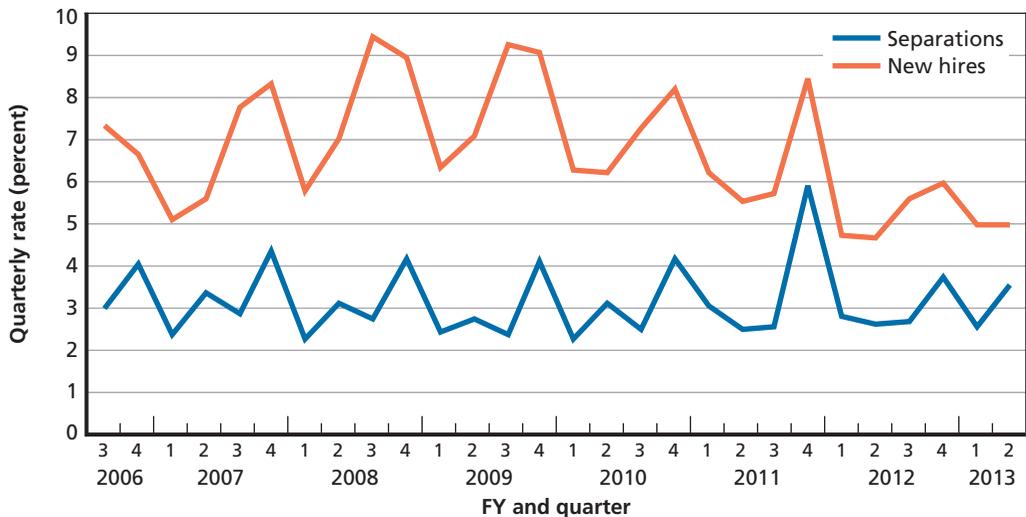


SOURCE: Authors' calculations based on DMDC data.
NOTE: Quarterly separation and new-hire rates are calculated as the number of separations or new hires during the quarter divided by the number of Army civilians at the end of the previous quarter.
**RAND** *RR576-3.3*

Separation rates tend to peak in the year immediately following retirement eligibility (Figure 3.5), suggesting potentially high rates of retirement over the next decade.

The share of retirement-eligible employees rises with pay grade. Figure 3.6 illustrates this relationship for GS employees. Very few employees in the lowest GS pay grades are retirement eligible; the share of retirement-eligible employees is approximately 10 percent from grades GS-05 through GS-10 and rises rapidly to over 30 percent between GS-11 and GS-15. The share of employees who are close to retirement eligibility also rises quickly in the upper pay grades. Although the share of retirement-eligible employees is highest in GS-15, the greatest numbers of retirement-eligible (and near-eligible) employees are found in GS-11, GS-12, and GS-13 (Figure 3.7).

As discussed in Chapter Two, the substantial share of retirement-eligible employees in higher pay grades will likely allow managers additional flexibility in shaping the pay grade structure of the workforce. As retirement-eligible employees leave, their vacant positions may be filled through promotions or new hires, thus allowing individual employees to progress in their careers while maintaining a relatively stable overall grade distribution. Alternatively, vacant positions may be eliminated, regraded, or otherwise changed to meet future requirements.[3]

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[3] While retirements can provide flexibility in altering pay grade structure, they may also entail a loss of human capital, including institutional knowledge held by departing employees.

**Figure 3.4**
**Distribution of Army Civilians by Years Relative to Retirement Eligibility**
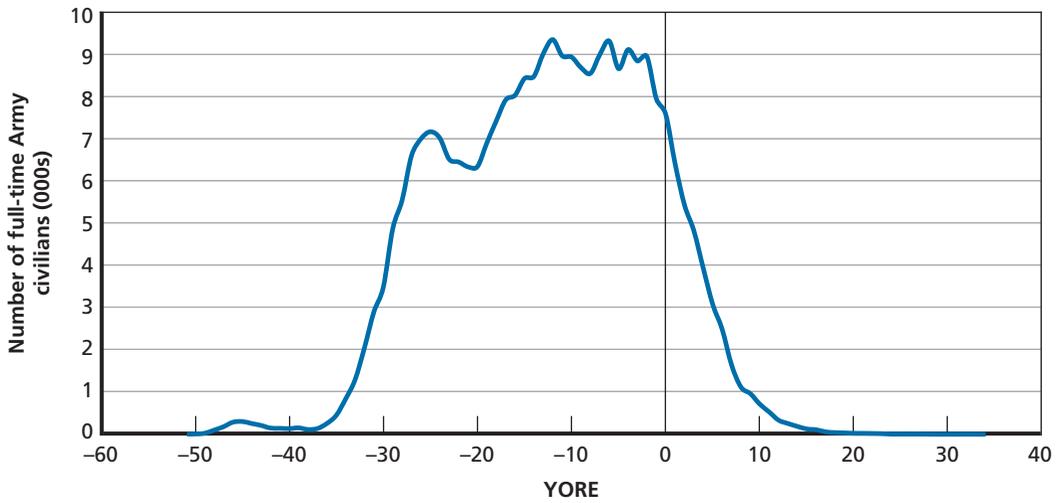


SOURCE: Authors' calculations based on DMDC data.
NOTE: Data are as of the end of FY 2012.
**RAND** *RR576-3.4*

**Figure 3.5**
**Separation Rates for FY 2012 by Years Relative to Retirement Eligibility**
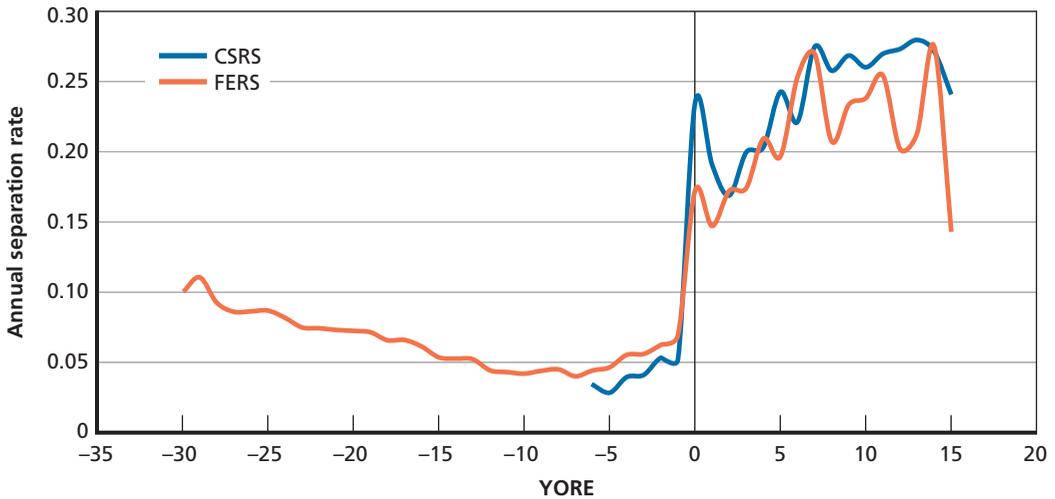


SOURCE: Authors' calculations based on DMDC data.
NOTE: Annual separation rate is calculated as the number of separations during FY 2012 divided by the
number of Army civilians at the end of FY 2011. Only employees covered by the CSRS and FERS
retirement plans are shown. CSRS employee data are not shown for very negative YORE because there
are very few CSRS employees with YORE less than –5.
**RAND** *RR576-3.5*

**Figure 3.6.**
**Percentage of GS Employees by Years Relative to Retirement Eligibility**
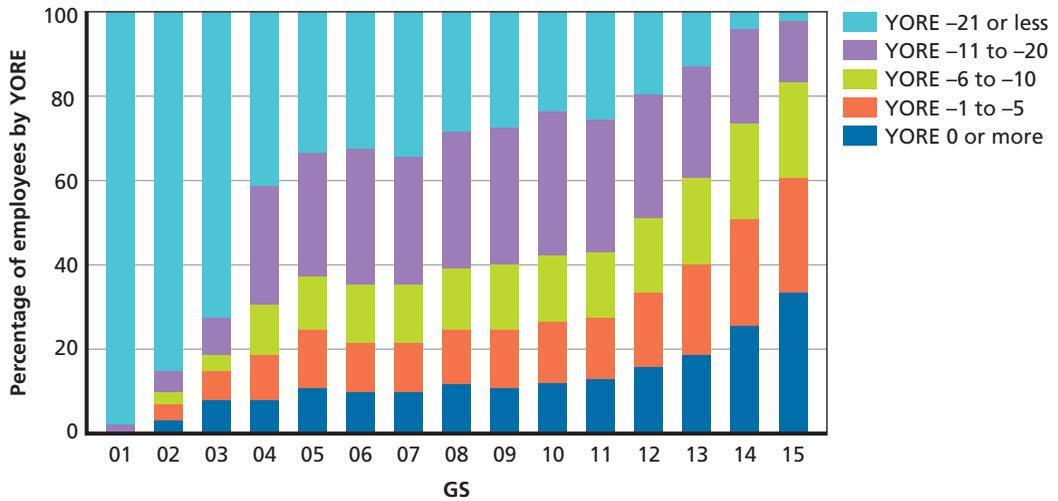


SOURCE: Authors' calculations based on DMDC data.
NOTE: Data are from end of FY 2012. Negative values of YORE indicate number of years until retirement
eligibility, while YORE 0 and above indicate retirement-eligible employees.
**RAND** *RR576-3.6*

**Figure 3.7**
**Number of GS Employees by Years Relative to Retirement Eligibility**
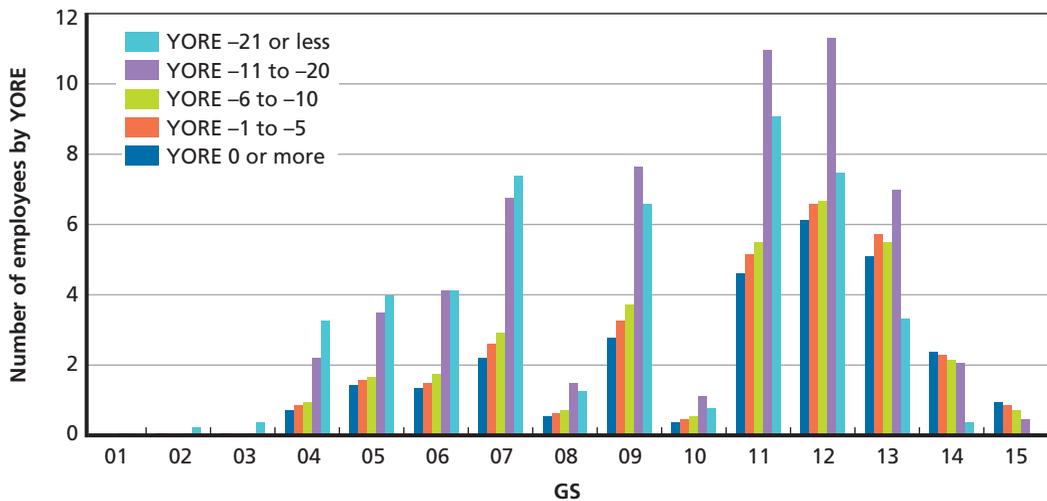


SOURCE: Authors' calculations based on DMDC data.
NOTE: Data are from end of FY 2012. Negative values of YORE indicate number of years until retirement
eligibility, while YORE 0 and above indicate retirement-eligible employees.
**RAND** *RR576-3.7*

However, if a hiring freeze remains in place, managers are not likely to be able to shape the grade structure because promotions are usually not permitted. Instead, as discussed in Chapter Two, employees can move up through pay steps within a pay grade but will not move to higher pay grades. This process, coupled with the fact that more employees in higher grades are retirement eligible, means that the grade structure would likely become skewed toward employees in lower pay grades but with higher pay within each pay grade.

To some extent, the anticipated upcoming retirements in the Army may reflect broader demographic trends in society. To explore this issue, we compared the distribution of Army civilians with respect to retirement eligibility to the distribution in the United States as a whole. The concept of retirement eligibility is different in the private sector than it is for federal employees, so we compared the age distribution of Army civilians at the end of FY 2012 to that of employees in other sectors, using 2012 data from the Bureau of Labor Statistics.

Figure 3.8 shows the distribution of employees in various age classes for the overall workforce, the workforce excluding government employees, private industry workers (excluding private-household workers), government employees, and Army civilians. All data are from the Bureau of Labor Statistics, with the exception of the Army data, which are from DMDC. Private-industry workers accounted for nearly 80 percent of the overall workforce (110 million out of 142 million employed persons), while government employees accounted for approximately 15 percent of the overall workforce

**Figure 3.8**
**Age Distribution of Army Civilians Versus Employees in Other Sectors**
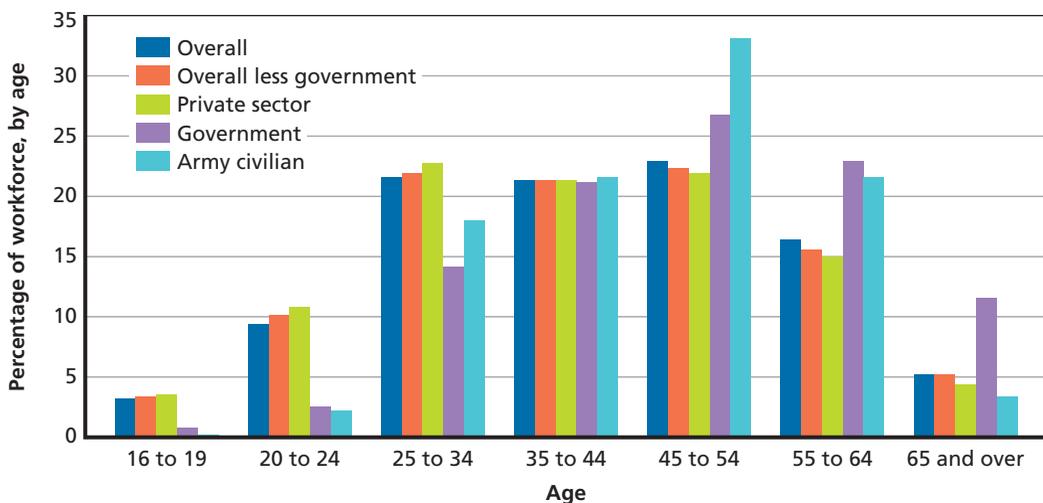


SOURCE: For Army civilians, numbers are authors' calculations based on DMDC data. All other numbers are reported by the Bureau of Labor Statistics, based on the Current Population Survey for 2012 (Bureau of Labor Statistics, 2012).

RAND RR576-3.8

(20 million out of 142 million employed persons). The age distribution of private-industry workers thus mirrors the overall age distribution of the workforce closely. In contrast, government employees tend to be older, with a higher share of workers aged 45 and up.

To the extent that workers 65 and older can be considered retirement eligible, a smaller share of the Army civilian workforce (3 percent) than of the private industry workforce (5 percent) falls into this category. However, the Army has a higher share of civilians (22 percent) who are nearing retirement eligibility (aged 55 to 64) than private industry (15 percent) does. Overall, the Army civilian workforce has an older age distribution, with 58 percent of the workforce aged 45 and older, compared with only 41 percent for private industry.

## Mission-Critical Occupations

The relatively high share of retirement-eligible or near-retirement-eligible workers can be a particular concern in MCOs. MCOs are occupations "designated by DoD and Dept of the Army as essential to current and future military and organizational mission accomplishment" (U.S. Department of the Army, 2011).[4]

For each MCO, we estimated average separation, switch-out, new-hire, and switch-in rates over the five years from FY 2008 to FY 2012, as well as the share of employees at or near (within five years of) retirement eligibility. Total loss rates are the sums of separations plus switches out; total gain rates are the sums of new hires plus switches in. The average number of employees in the MCO is based on the base period size corresponding to each of the five years for which we considered flows (thus, end of FY 2007 through end of FY 2011). We also calculated *implied net gains*, which are equal to the average population multiplied by the net gain rate (average gain rate minus average loss rate), and *implied steady state populations*, which represent average annual accession counts divided by the average annual attrition rates (Keating et al., 2010).

Appendix C provides detailed results for all 42 Army MCOs. In Table 3.1, we summarize results for a few MCOs that may warrant close monitoring. We based this list on two criteria: (1) 45 percent or more of employees at or near retirement eligibility or (2) a negative net gain rate. To put the net gain rates in perspective, the Army as a whole experienced an average new-hire rate of 11.3 percent from FY 2008 through FY 2012, and a separation rate of 8.4 percent, which yields a net gain rate of 2.8 percent.

The first four MCOs in Table 3.1 (Financial Management, Construction Control Technician, Education Services, and Engineering Technician) are included because 45 percent or more of their employees are at or within five years of retirement eligibil-

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[4]   The U.S. Army provided the list of MCOs.

**Table 3.1**
**Mission-Critical Occupations with High Shares of Employees Near Retirement Eligibility or Low Net Gain Rates**

| Occupation | Average Number of Employees | Loss Rate (%) | Gain Rate (%) | Share of Employees at or Near Retirement-Eligibility, FY 2012 (%) | Implied Net Gains | Implied Steady-State Population |
|---|---|---|---|---|---|---|
| Financial management | 223 | 20 | 19 | 51 | −1 | 216 |
| Construction control tech. | 1,299 | 14 | 18 | 50 | 56 | 1,712 |
| Education services | 494 | 13 | 15 | 49 | 12 | 583 |
| Engineering tech. | 4,055 | 16 | 17 | 45 | 21 | 4,191 |
| Police | 2,797 | 16 | 13 | 13 | −80 | 2,177 |
| Language | 46 | 14 | 12 | 41 | −1 | 39 |

SOURCE: Authors' calculations based on DMDC data.

NOTE: Average number of employees is based on baseline counts from FY 2007 through FY 2011. Rates are based on flows from FY 2008 through FY 2012. Shares of employees at or near (within five years of) retirement eligibility are averages from FY 2008 through FY 2012.

ity. Since separation rates jump when employees reach retirement eligibility, managers for these occupations may need to ensure that they have a sufficient pipeline of personnel who can fill vacancies as needed.

In addition, three MCOs in Table 3.1 (Financial Management, Police, and Language) are included because their net gain rates (that is, overall gain minus overall loss rates) are negative.[5] This implies that, if historical patterns continue, the workforce will shrink. The implied losses are relatively small for Financial Management and Language, due to the small sizes of these MCOs. The implied steady-state size (216) for the Financial Management MCO is approximately 97 percent of its average historical size, while the implied steady-state size (39) for the Language MCO is approximately 85 percent of its average historical size. The Police MCO has somewhat larger implied losses in absolute terms, and its implied steady-state size (2,177) is approximately 78 percent of its average historical size.

This descriptive exercise provides a starting point that may be helpful in identifying which MCOs to examine more closely. However, the historical hiring and separation rates reflect both demand and supply, and Army managers are best positioned to understand whether the implied loss and retirement rates described here pose a con-

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[5]  Technically, the Environmental Protection MCO also has a negative net gain rate. However, overall loss and gain rates are within one-quarter percentage point of each other; therefore, we did not include this MCO in Table 3.1.

cern. The implied losses in certain MCOs may not be a concern if managers in these MCOs can meet their goals with a smaller workforce. A sharp increase in retirements might be more challenging if there is not a sufficient pipeline of employees with the right skills to fill vacancies.

# Personnel Projections

This chapter summarizes personnel projections under each of the hiring scenarios outlined in Chapter Two. We begin by showing the projected workforce sizes by command and occupation for the first set of scenarios: historical hiring rates, a hiring freeze, and various hiring rates in between these two extremes. We then show how the size of each command and occupation would need to change to meet the requirements the GTO model projects, as well as other overall targets.

## From Historical Hiring to a Hiring Freeze

Figure 4.1 shows projections for the Army civilian workforce under historical hiring, a new-hire freeze, and various hiring levels between these two extremes. From FY 2008

**Figure 4.1**
**Total Projected Army Civilian Workforce Supply: From Historical Hiring to a Hiring Freeze**
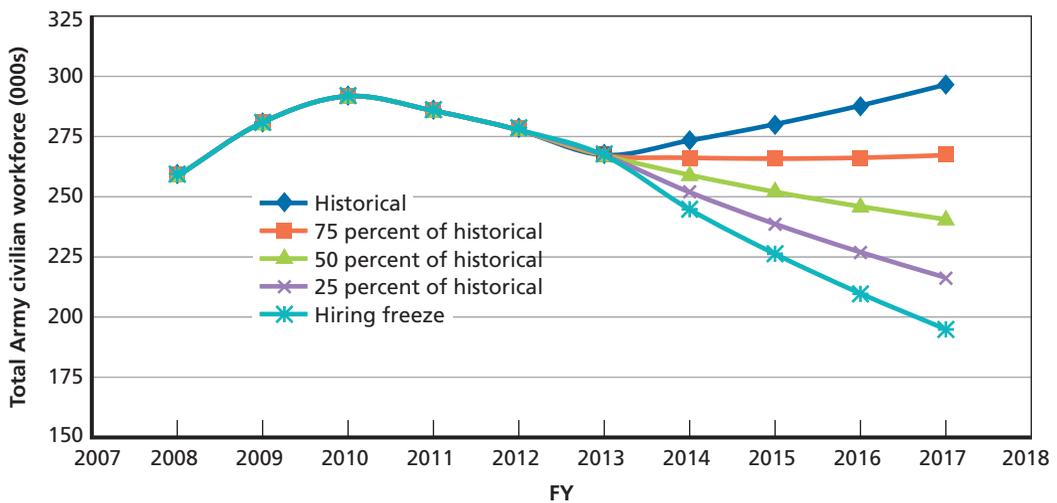


SOURCE: Authors' calculations based on DMDC data and RIM results.

to FY 2010, the number of Army civilians rose by nearly 15 percent, from 260,000 to over 290,000. The trend was later reversed, resulting in a workforce of approximately 268,000 civilian employees by FY 2013. Under historical hiring rates, RIM assumes that the historical average hiring, separation, and internal transfer rates (from FY 2005 through FY 2012, excluding the unusual years of FY 2007 through FY 2009) will continue through FY 2017, resulting in a total workforce of approximately 297,000 civilian employees (a 10-percent increase over FY 2013).

At the other end of the spectrum, a complete hiring freeze would result in a workforce that is nearly 30 percent smaller (approximately 195,000 employees) by FY 2017. Because a complete hiring freeze is unlikely, we also examined scenarios that assume hiring at 25 percent, 50 percent, and 75 percent of historical rates. Rates of 25 and 50 percent would reduce the workforce by approximately 20 percent and 10 percent, respectively. With new-hire rates at approximately 75 percent of historical rates, the workforce size would remain fairly stable.

Figure 4.2 shows projected workforce sizes for the ten largest commands (in terms of workforce size in FY 2013). Similarly, Figure 4.3 shows projected percentage changes in workforce size, relative to FY 2013, for the ten largest commands. Under historical hiring conditions, seven of the ten largest commands would grow, while the remaining three would shrink. Army Materiel Command, the largest in FY 2013, with over 63,000 civilians, would grow by 15 percent, reaching nearly 73,000 civilians by FY 2017. Medical Command, Training and Doctrine Command, and the Field Operating Agencies of the Army Staff would also grow by 22, 15, and 10 percent, respectively. Network Enterprise Technology Command, which has experienced rapid growth in recent years, would double its size by FY 2017 if growth rates continue as they have in the past. Acquisition Support, while not projected to grow as quickly, would nonetheless increase by nearly 50 percent. In contrast, the Army National Guard and Army Support to Reserves would shrink by several percent, while Installation Management Command would shrink by over 15 percent.

At the other end of the spectrum, a complete hiring freeze would result in decreases ranging from 20 to 40 percent in nearly all the top ten commands. As we would expect, these projected reductions become much less pronounced under hiring rates at 25 and 50 percent of historical rates, although for most commands, some reduction in size is projected under both these hiring scenarios. Twenty-five-percent hiring rates are typically associated with reductions on the order of 10 to 30 percent, while 50-percent hiring rates are associated with reductions on the order of 5 to 20 percent. As discussed above, the overall workforce size remains stable under the 75-percent hiring scenario. Consistent with this finding, five of the ten commands are projected to grow, while another five are projected to shrink, under this scenario. The changes are much less pronounced, typically on the order of a few percent.

We also examined projected workforce changes for each of the ten largest occupations in FY 2013 (Figures 4.4 and 4.5). Under historical hiring conditions, almost all

**Figure 4.2**
**Projected Workforce Size in FY 2017 by Command: From Historical Hiring to a Hiring Freeze**
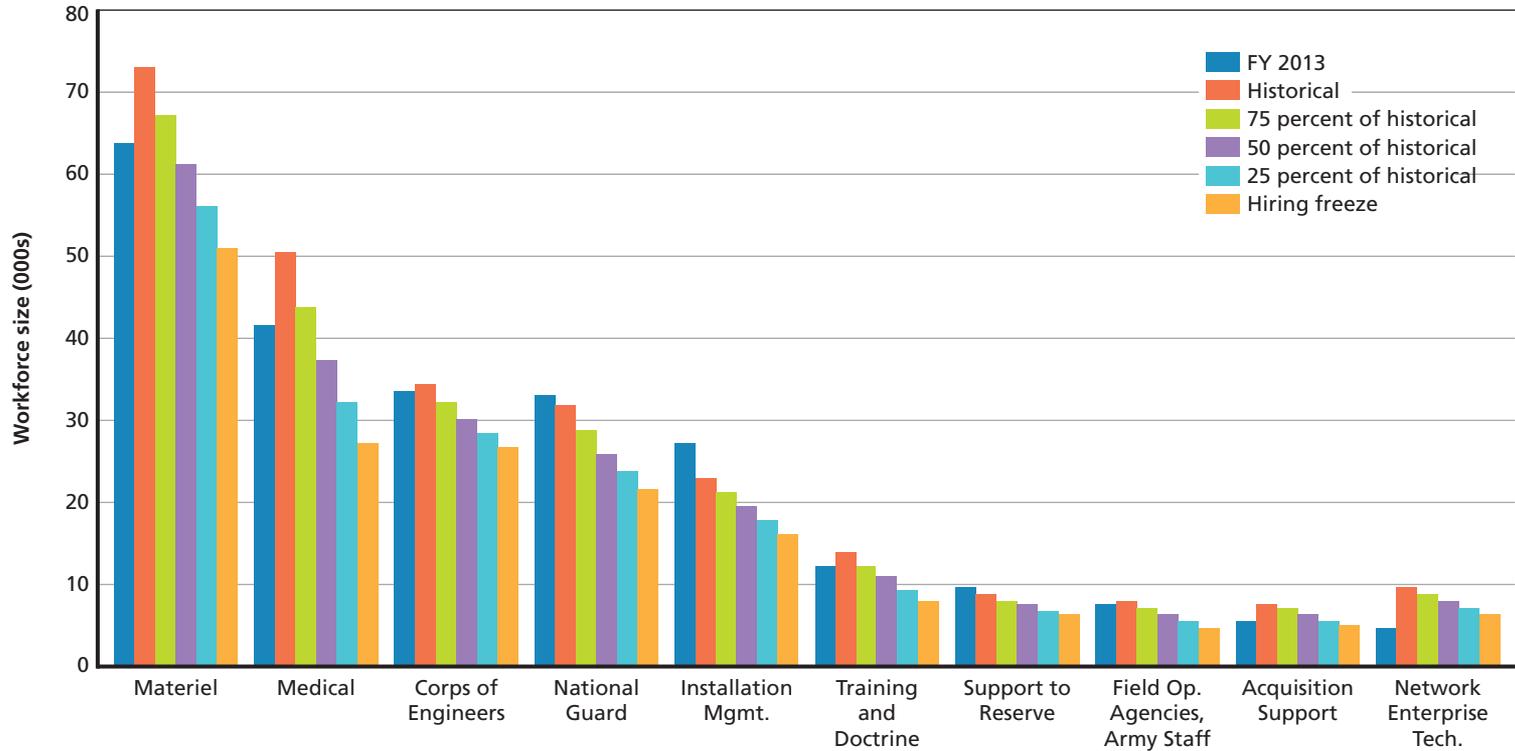


SOURCE: Authors' calculations based on DMDC data and RIM results.

**RAND** *RR576-4.2*

**Figure 4.3**
**Projected Percentage Change in Workforce Size from FY 2013 to FY 2017 by Command: From Historical Hiring to a Hiring Freeze**
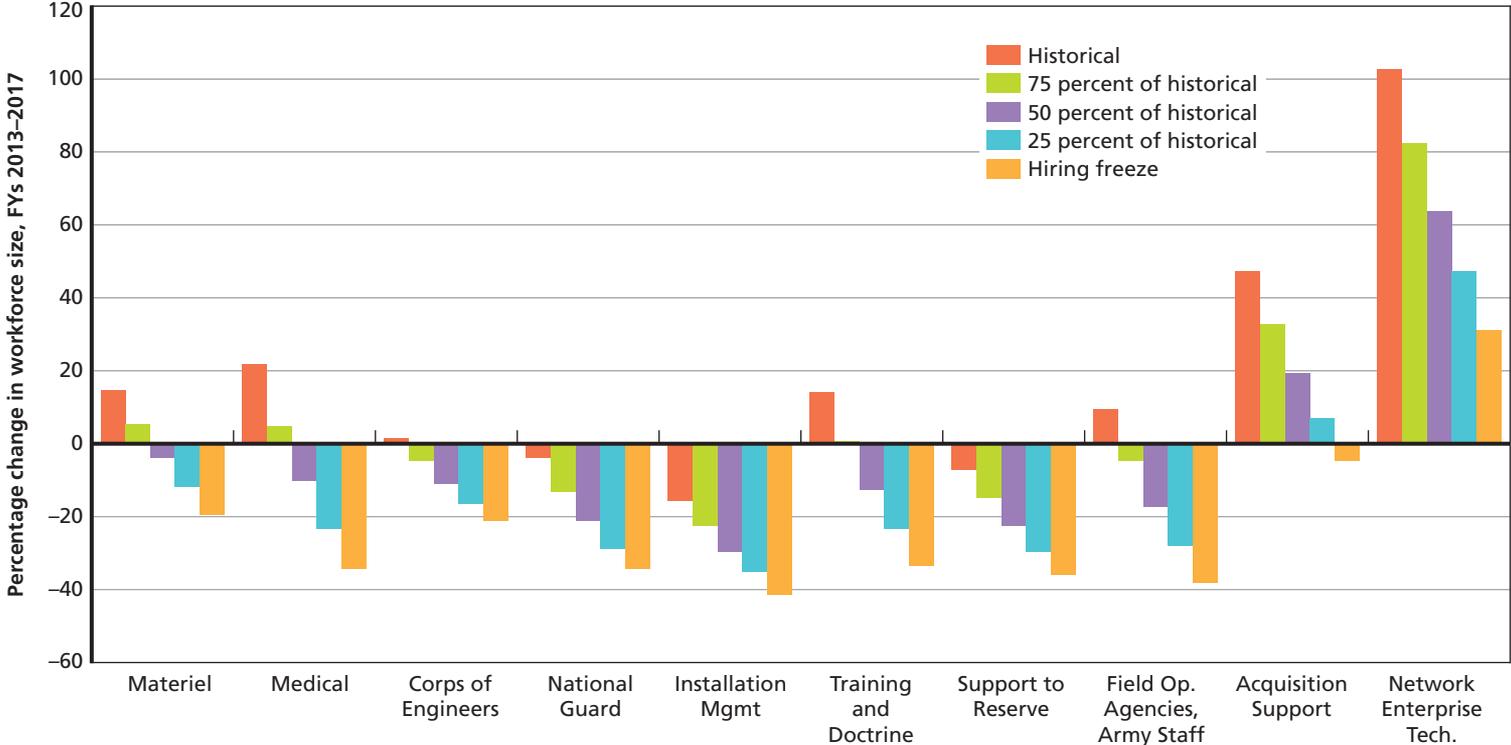


SOURCE: Authors' calculations based on DMDC data and RIM results.

**RAND** *RR576-4.3*

**Figure 4.4**
**Projected Workforce Size in FY 2017 by Occupation: From Historical Hiring to a Hiring Freeze**



SOURCE: Authors' calculations based on DMDC data and RIM results.

**RAND** *RR576-4.4*

**Figure 4.5**
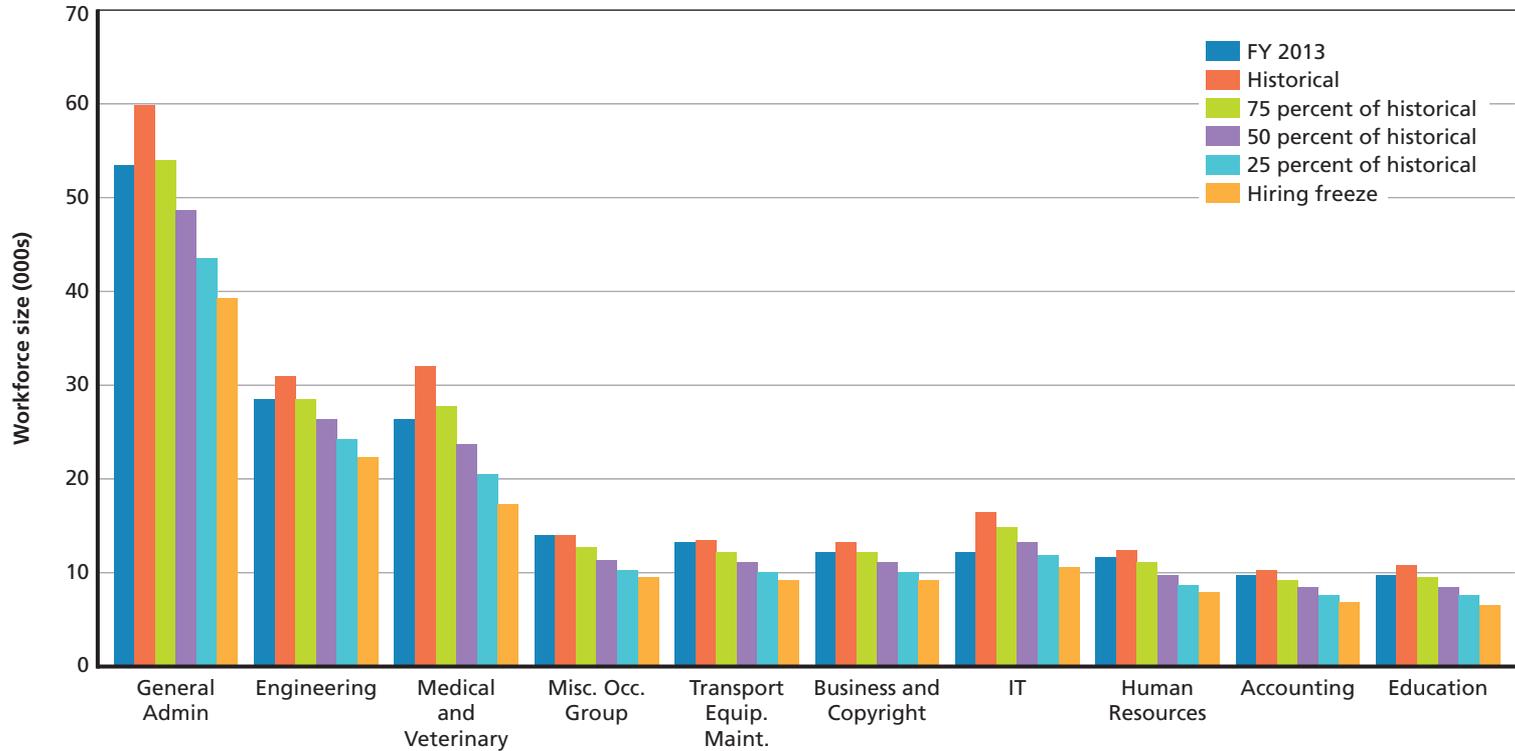**Projected Percentage Change in Workforce Size from FY 2013 to FY 2017 by Occupation: From Historical Hiring to a Hiring Freeze**



SOURCE: Authors' calculations based on DMDC data and RIM results.
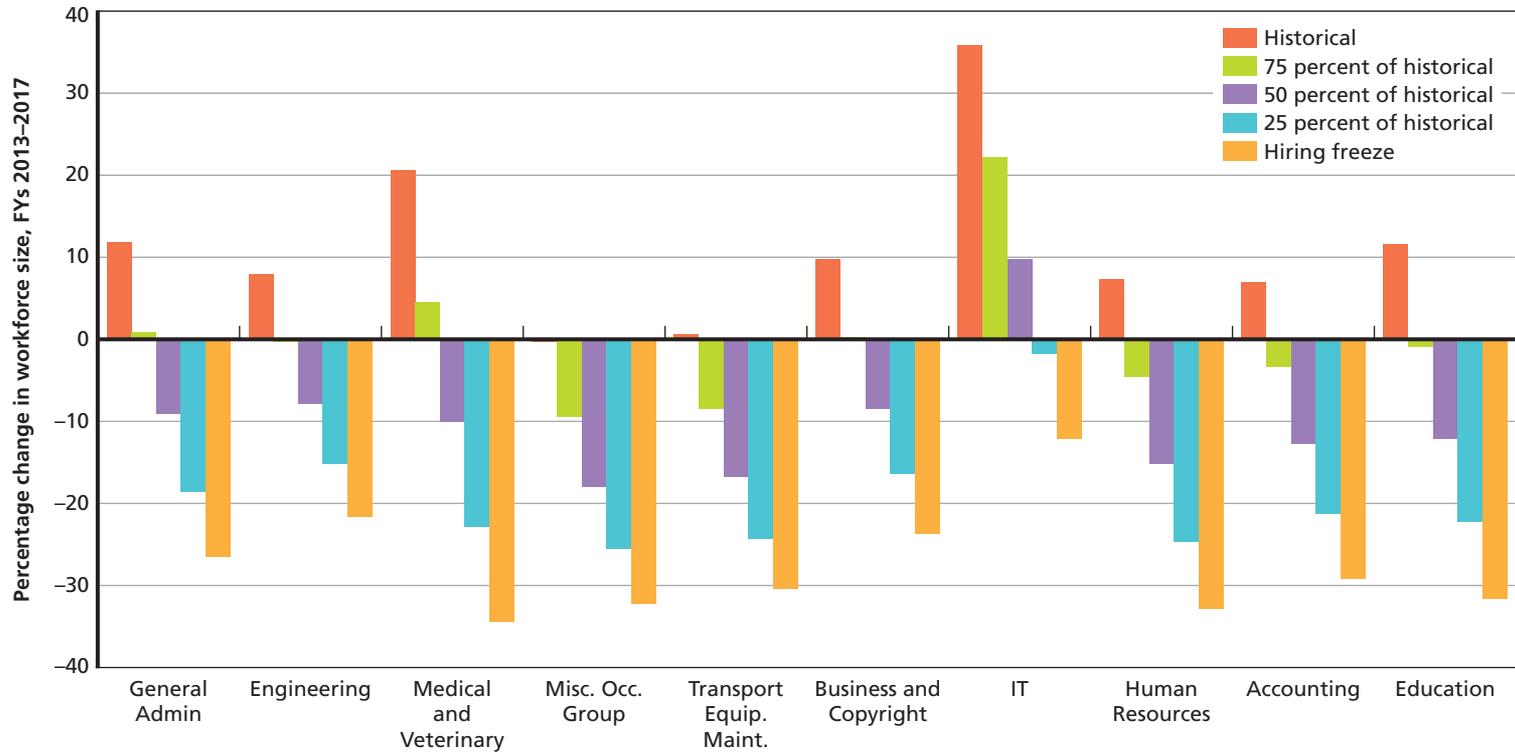RAND *RR576-4.5*

occupations are projected to grow. The largest, general administration, is projected to increase by 12 percent, from 53,000 to 60,000 by FY 2017. Several other occupations (engineering, business and copyright, human resources, and accounting) are also projected to increase by nearly 10 percent. At the upper end, the medical and veterinary occupations are projected to grow by 20 percent and the IT occupation by 35 percent, reflecting rapid hiring in recent years.

As with commands, we see the same pattern in terms of workforce size reduction by occupation under the various hiring scenarios. A hiring freeze results in 20- to 35-percent cuts to the largest occupations, while the 25- and 50-percent new-hire rates typically result in reductions but of a smaller magnitude. All of the ten largest occupations are projected to shrink under the hiring freeze and the 25-percent hiring scenario, while only the IT occupation is projected to grow under the 50-percent hiring scenario. With hiring rates at 75 percent of their historical levels, the IT workforce grows substantially, and the miscellaneous and transport equipment occupations decrease by about 10 percent; the remaining occupations are fairly stable.

This heterogeneity in responses across commands and occupations is driven by the fact that our supply projection model assumes that historical rates continue into the future. For example, the IT occupation is projected to grow, even with a 50-percent hiring scenario, because this occupation has experienced relatively high new-hire and switch-in rates, relative to separation and switch-out rates, over the last several years.

The fact that Network Enterprise Technology Command is projected to grow under all scenarios, including a hiring freeze, deserves some further discussion. As we discussed in Chapter Two, RIM assumes that historical separation and switching rates continue into the future. We attempted to mitigate concerns about unusual historical patterns by excluding FYs 2007, 2008 and 2009, which exhibited particularly high switching and new-hire rates for the Army as a whole. However, Network Enterprise Technology Command exhibited a particularly high switch-in rate in FY 2010, which is included in our historical data (see Appendix E for graphs of historical population and flow rates for this command). It is beyond the scope of the current effort to examine how variations in historical switching or separation rates would affect future projections. Nonetheless, a manager seeking to understand the potential growth in Network Enterprise Technology Command should be aware that, if another large internal transfer episode is not expected, the command is likely to exhibit similar behavior to those of the other large commands under the various hiring scenarios.

## Meeting Projected Authorizations

We now turn to the set of scenarios that aims to meet certain projected authorizations, by command and occupation, by FY 2017. The first scenario aims to meet targets based

on applying the GTO model to the President's Budget for FY 2014.[1] The next three scenarios aim to achieve target workforce sizes of 240,000, 220,000, and 200,000, with changes proportionally distributed according to changes needed to meet the GTO targets.

Figure 4.6 shows the size of the projected Army civilian workforce under each of these scenarios, as well as the scenario that assumes historical hiring. In contrast with the historical hiring scenario, which projects 10-percent growth by FY 2017, the GTO target scenario requires a reduction to approximately 259,000 (a reduction of about 3.5 percent) over the same four-year period.

Figures 4.7 and 4.8 show that, under the GTO target scenario, all commands are projected to shrink by a few percent. It is interesting to note that in certain cases (Installation Management Command and Active Army Support to Reserve), the projected reduction is smaller under the GTO target scenario than under the historical hiring scenario.

Achieving smaller workforce sizes requires larger cuts to all the top commands. For the smallest target workforce size of 200,000 by FY 2017, the top ten commands are each projected to decrease by 20 to 30 percent. In all the target scenarios, the largest reductions (in terms of percentage) are seen in Medical Command and the Army National Guard, with the smallest reductions in Army Materiel Command, the Army Corps of Engineers, Support to Reserve, and Acquisition Support.

**Figure 4.6**
**Total Projected Army Civilian Workforce Supply: Meeting Various Targets**
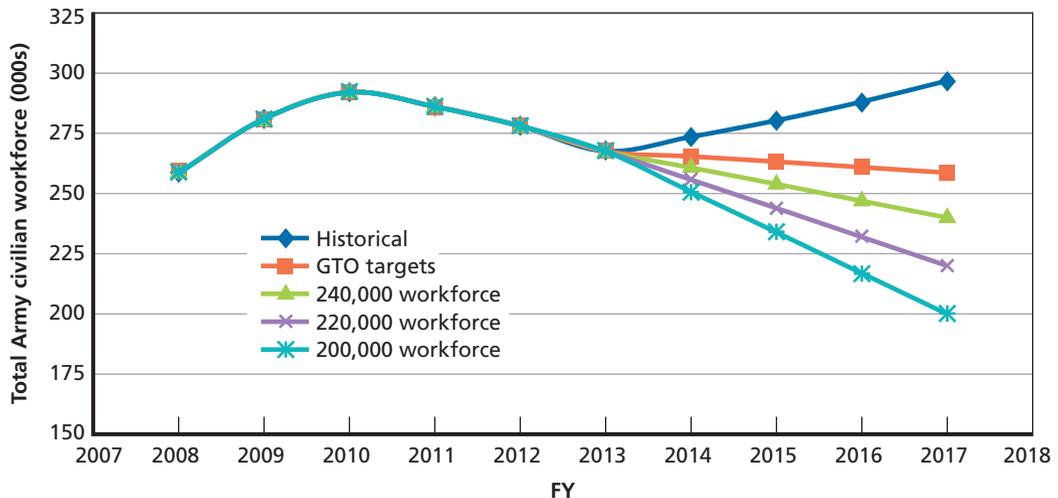


SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.
RAND RR576-4.6

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[1]  Appendix D summarizes results for the alternative target scenario approach based directly on the President's Budget, as discussed in Chapter Two. Results are similar to those presented in this chapter.

**Figure 4.7**
**Projected Workforce Size in FY 2017 by Command: Meeting Various Targets**
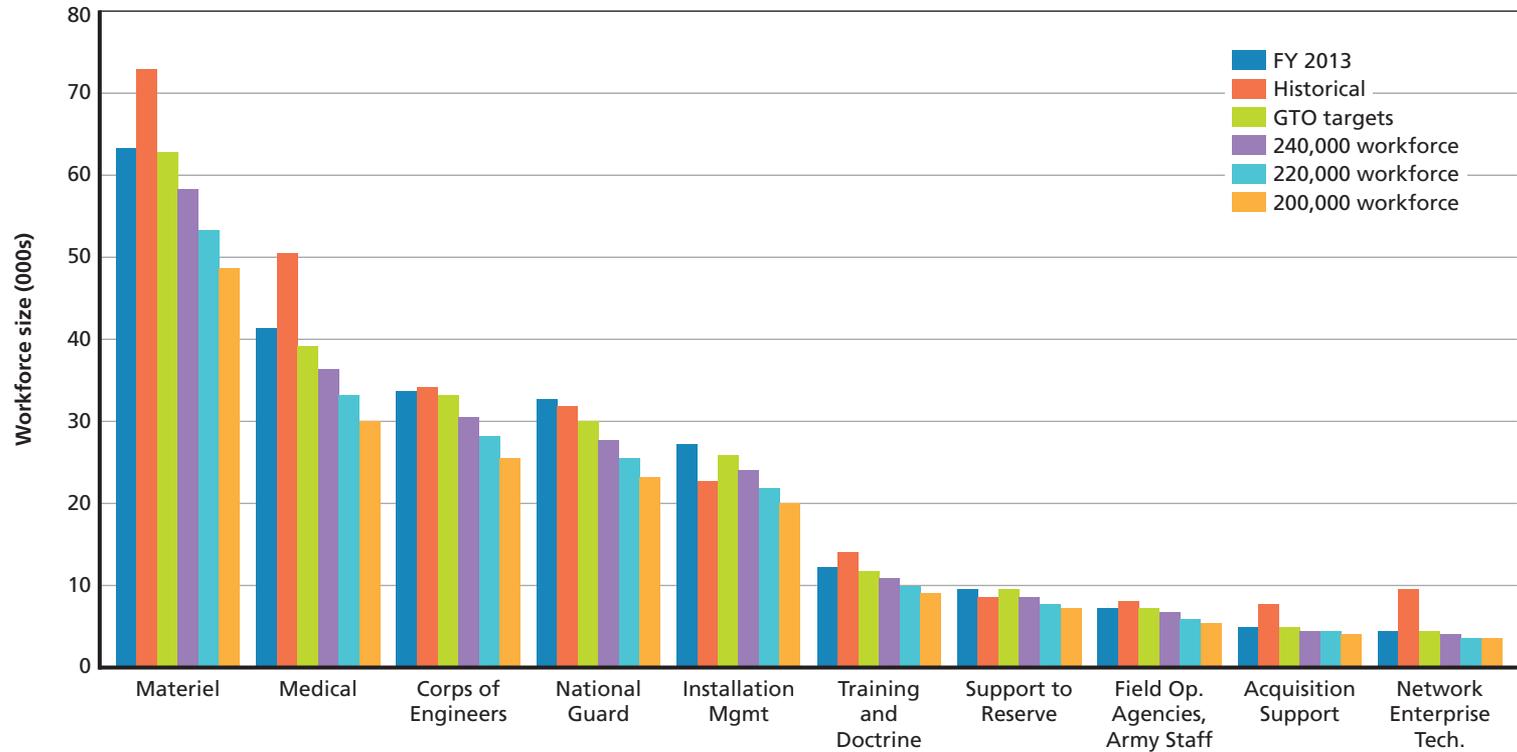


SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.

**Figure 4.8**
**Projected Percentage Change in Workforce Size from FY 2013 to FY 2017 by Command: Meeting Various Targets**



SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.

**RAND** *RR576-4.8*

By occupation, the results are fairly similar (Figures 4.9 and 4.10). Again, all of the top ten occupations are expected to see a reduction in size of several percent by FY 2017 under the GTO target scenario. Occupations expected to face the greatest projected reductions (in percentage terms) include Medical and Veterinary, Transport Equipment, and Human Resources. Similar to commands, under the smallest target workforce size of 200,000 by FY 2017, the top ten occupations are each projected to decrease by 20 to 30 percent.

**Figure 4.9**
**Projected Workforce Size in FY 2017 by Occupation: Meeting Various Targets**
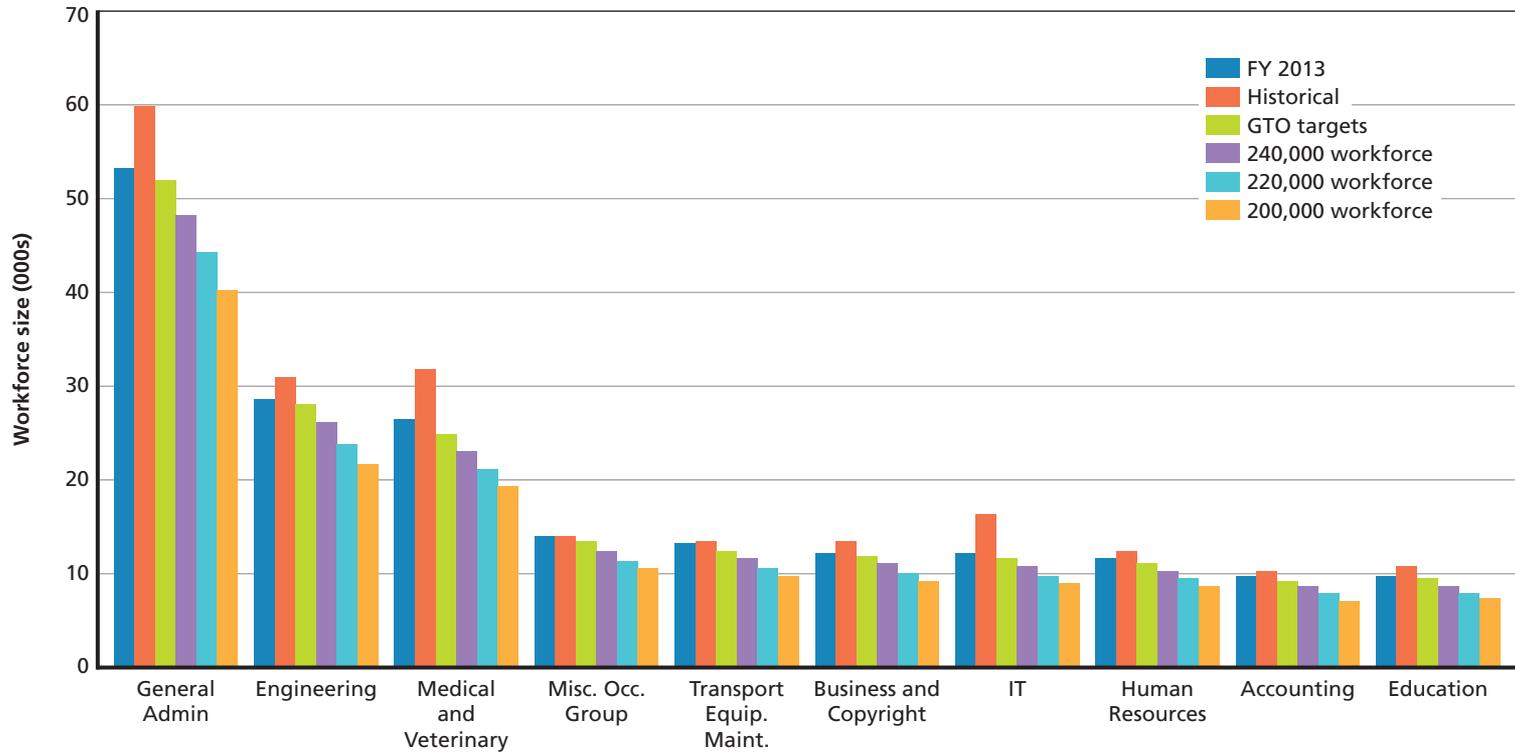


SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.

**Figure 4.10**
**Projected Percentage Change in Workforce Size from FY 2013 to FY 2017 by Occupation: Meeting Various Targets**
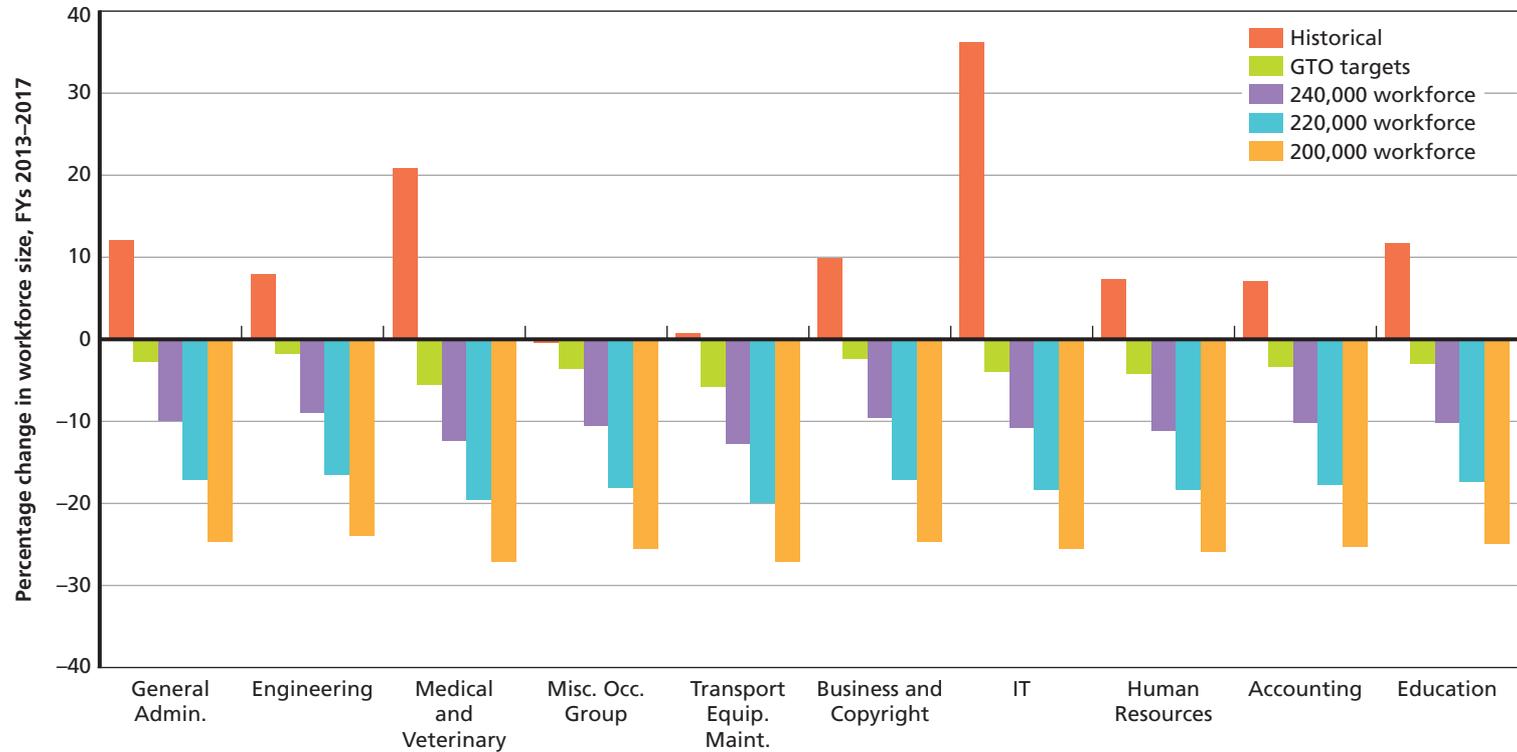


SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.

**RAND** *RR576-4.10*

# Potential Implications for Civilian Policies

The analyses in the previous chapters indicate that, for the Army as a whole, meeting the civilian target requirements the GTO model projects will require reducing workforce size by approximately 3 to 4 percent. This change falls between the two extremes of the 10-percent increase that would be seen under historical conditions and the nearly 30-percent decrease anticipated under a hiring freeze. These overall changes mask substantial heterogeneity across commands and occupations.

This chapter examines the implications of the various hiring scenarios for workforce management. First, we compare the number of new hires (or forced additional reductions) that would be required to meet projected workforce size under a selected set of scenarios:

- historical hiring
- 75 percent of historical hiring
- GTO targets
- target workforce of 240,000
- target workforce of 220,000
- target workforce of 200,000.

We selected these scenarios to illustrate a broad range of workforce sizes and distributions by FY 2017. Figure 5.1 shows historical and projected future workforce sizes under each of the six scenarios listed above.

We then present cost estimates for all the hiring scenarios, under each of the cost scenarios described in Chapter Two. We also estimate the costs of the RIFs associated with the target scenarios.

## New Hires and Additional Reductions

Figure 5.2 shows the total numbers of new hires, separations, and additional reductions that are projected under the six scenarios listed above. These totals are for the four-year period from FY 2013 through FY 2017. As we would expect, the number of

**Figure 5.1**
**Total Projected Army Civilian Workforce Supply Under Selected Scenarios**



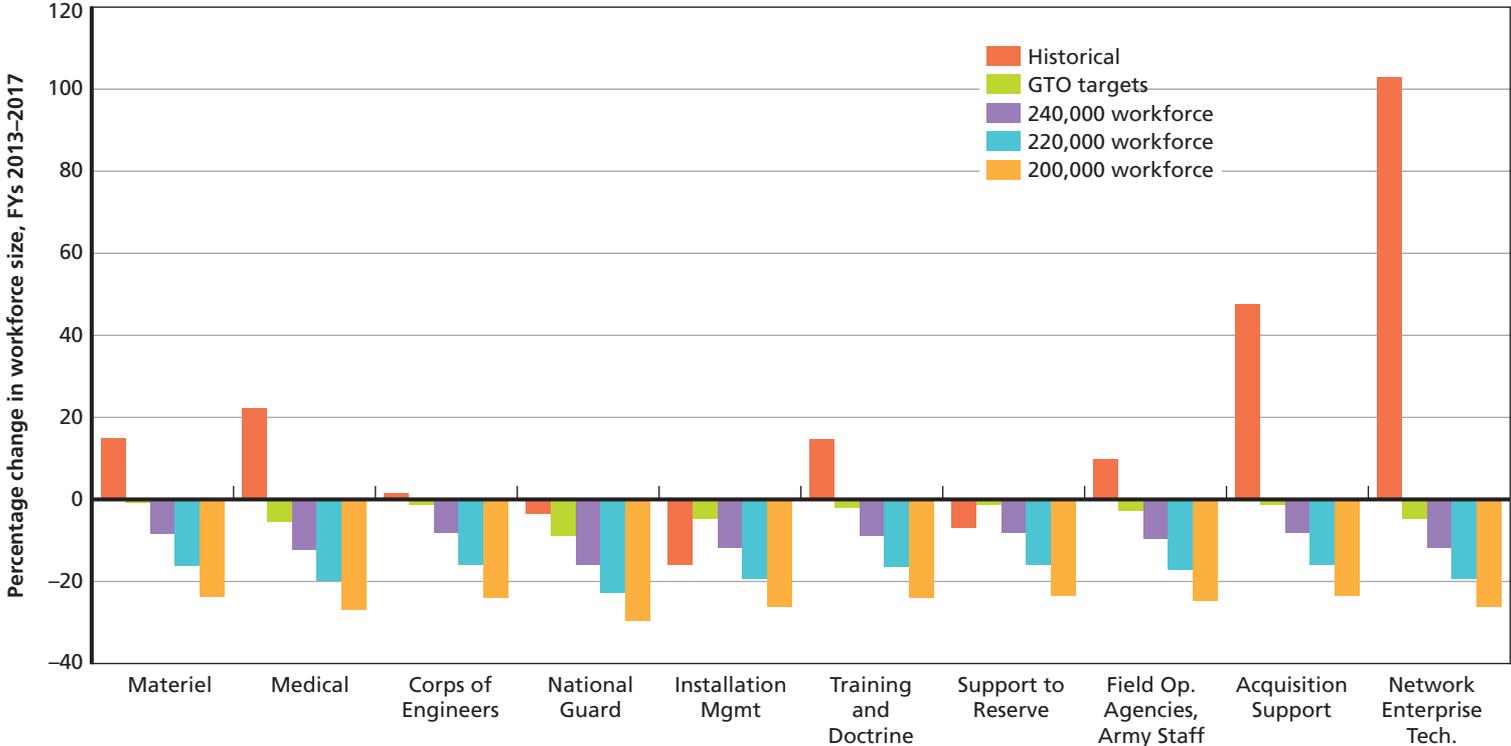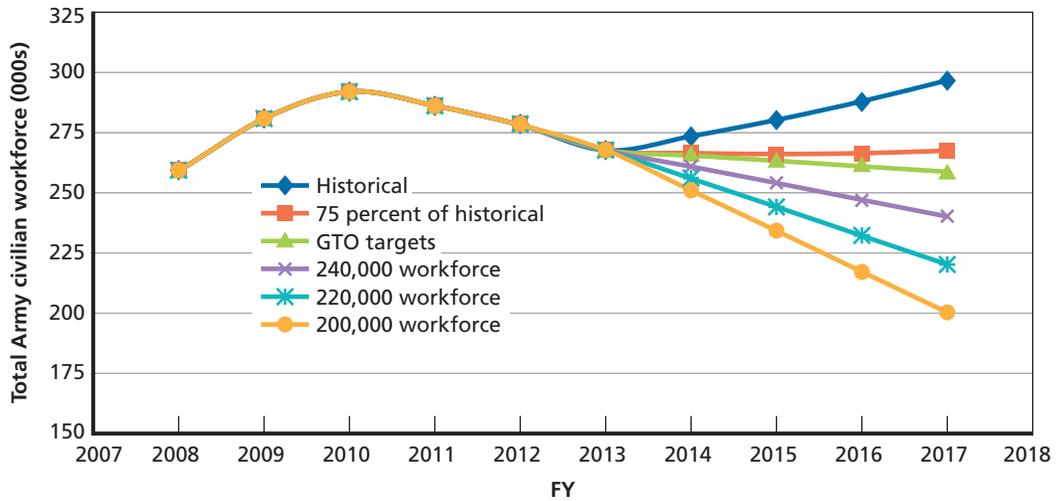SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.
RAND *RR576-5.1*

**Figure 5.2**
**Total Projected Numbers of New Hires, Separations, and Additional Reductions from FY 2013 to FY 2017 Under Selected Scenarios**
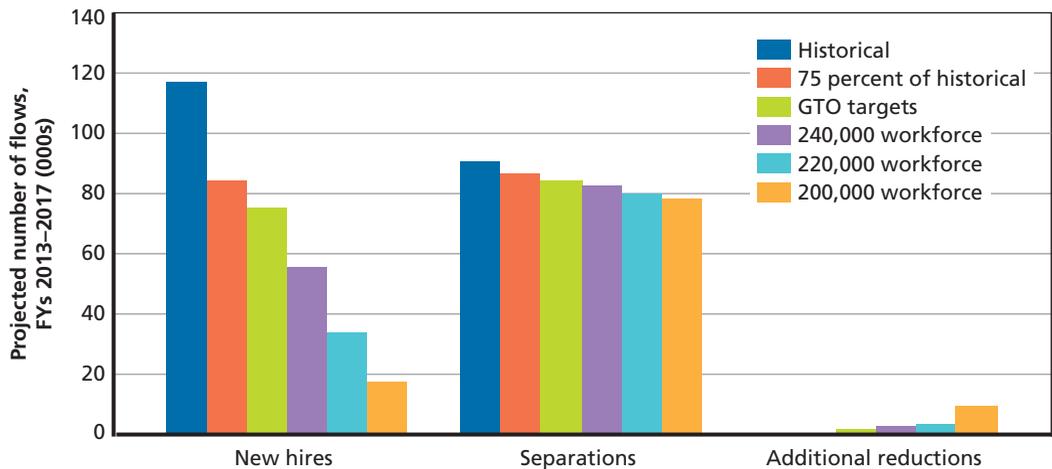


SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.
RAND *RR576-5.2*

new hires is nearly 120,000 under the historical hiring scenario and decreases with the projected FY 2017 workforce size. It is worth noting that, although the scenario with 200,000 civilians by FY 2017 yields a workforce size similar to that of the hiring freeze, approximately 16,000 new hires are still required under this scenario. The reason is

that we aimed to meet the total target while distributing changes proportionally to GTO model changes. Therefore, there are new hires in certain commands and occupations and reductions in others. This is illustrated by the last set of bars in Figure 5.2. Each of the target scenarios requires some additional reductions between FY 2013 and FY 2017, ranging from approximately 1,600 for the GTO target scenario to 8,700 for the target size of 200,000. However, these numbers are approximately one-tenth the size of the numbers of other separations, which were projected based on historical attrition.[1]

Figures 5.3 and 5.4 highlight the differences in hiring and reductions that are projected across commands. For five of the top ten commands (Materiel, Medical, Training and Doctrine, Acquisition Support, and Network Enterprise Technology), meeting GTO targets would result in substantially fewer new hires relative to the 75-percent hiring scenario. In contrast, for the remaining five commands (Army Corps of Engineers, National Guard, Installation Management, Army Support to Reserve, and Field Operating Agencies of the Army Staff), meeting GTO targets would result in more new hires than the 75-percent hiring scenario. For two of these commands (Installation Management and Army Support to Reserve), hiring would need to increase above historical rates to meet GTO targets.

In nearly all target scenarios, the majorities of additional reductions are concentrated in two commands: Acquisition Support and Network Enterprise Technology. The reason is that these two commands have experienced particularly high rates of switches in from other commands; therefore, even when we assume that there will be no new hires in these commands, their sizes continue to grow due to internal transfers. This suggests that, in most cases, the numbers of additional reductions may be moderated by limiting such internal transfers. As we discussed in Chapter Four, Network Enterprise Technology Command, in particular, exhibited a very high switch-in rate in FY 2010. To the extent that such a large number of switches in is not expected in the next few years, the projected additional reductions are unlikely to be needed under all but the lowest target scenarios.

Once we consider the lowest target scenarios, though, it appears that mandatory reductions may be necessary across several commands. In the scenario that aims to achieve a workforce size of 200,000 by FY 2017, Army Materiel Command and the Army Corps of Engineers also require substantial additional reductions, of approximately 2,700 and 1,300, respectively.

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[1]   Readers may ask why the additional reductions are not proportional (in the sense that, for example, the target scenario with 220,000 employees does not require 20,000 more additional reductions than the target scenario with 240,000 employees). The reason is that most of the targets can be achieved by reducing hiring rates. Additional reductions are only required in commands and occupational groups, in which not even reducing hiring rates to zero will produce the target size.

**Figure 5.3**
**Projected Numbers of New Hires by Command: Selected Scenarios**
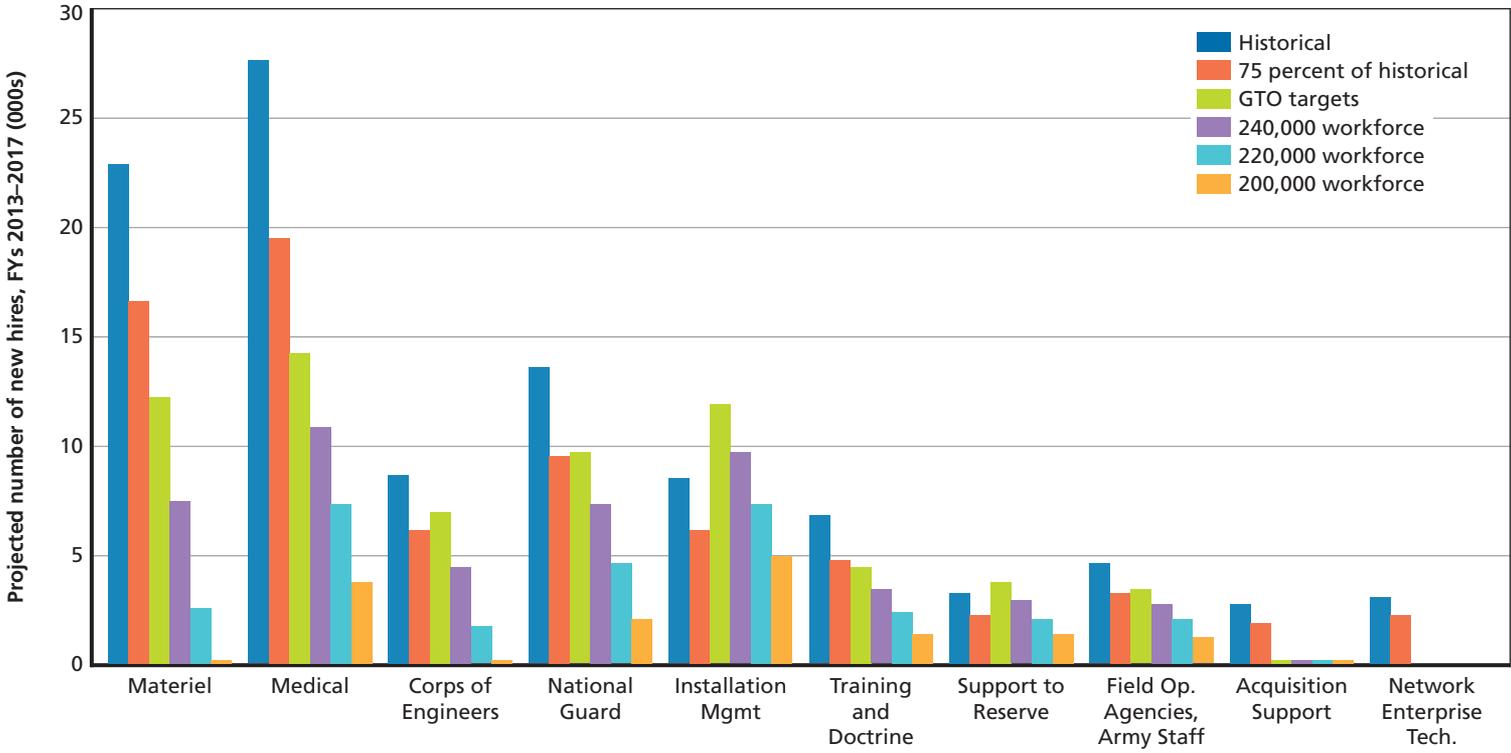


SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.
**RAND** *RR576-5.3*

**Figure 5.4**
**Projected Numbers of Additional Reductions by Command: Selected Scenarios**
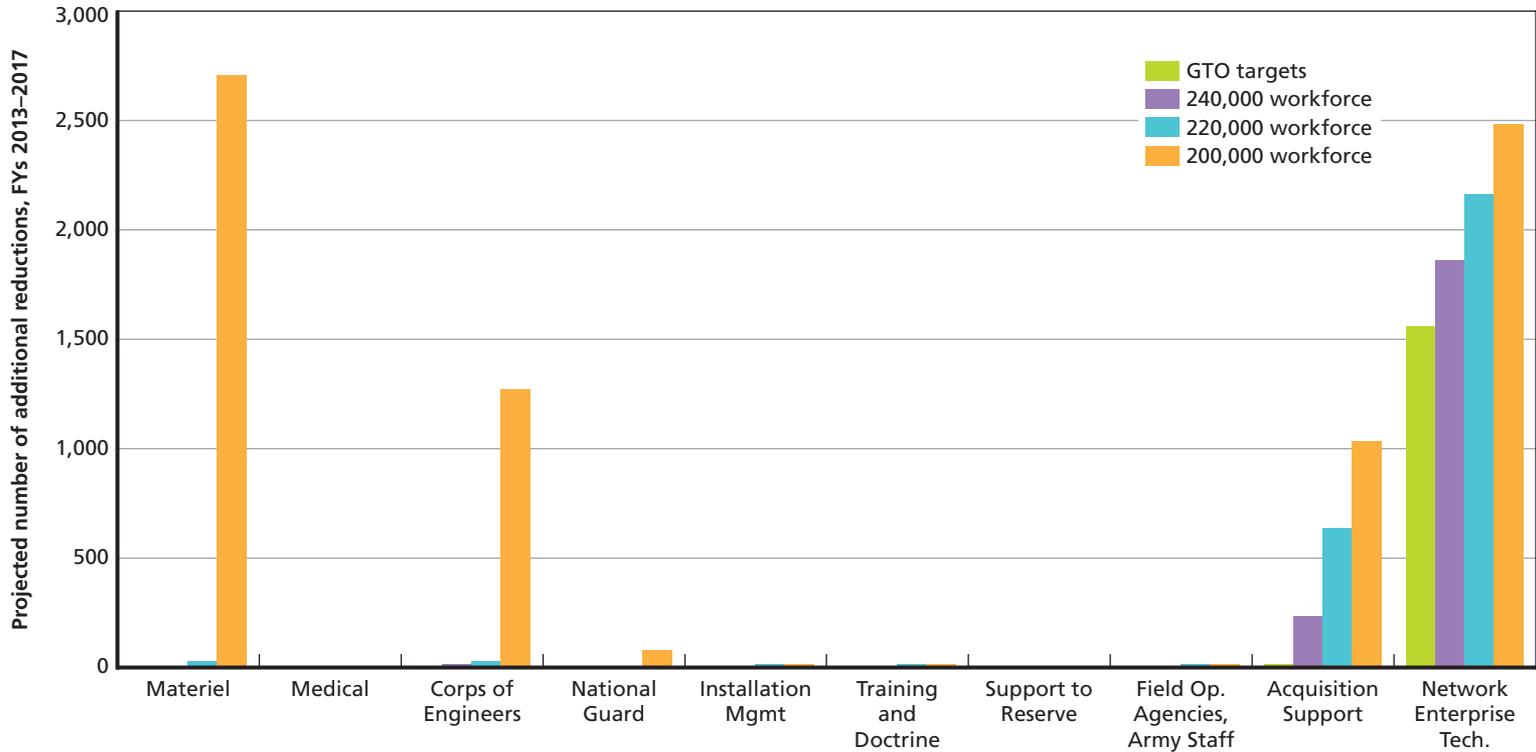


SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.

RAND *RR576-5.4*

## Cost Projections

This section presents the cost associated with each of the projected workforce sizes, under the various assumptions about cost structure that were outlined in Chapter Two. All cost projections are provided in nominal dollars. Note that the costs in Table 5.1 do not include severance pay for any required RIF; this pay is discussed later.

In FY 2013, the estimated cost of Army civilian personnel to the government was $27.5 billion (Table 5.1). Since DoD does not bear the entire retirement cost for CSRS and FERS employees, the estimated total cost to DoD was $25.7 billion. Given a workforce of approximately 268,000 in FY 2013, this yields an average cost to DoD of approximately $96,000 per civilian and an average cost to the government of approximately $103,000 per civilian.

The first cost scenario assumes that the pay grade structure is stable but that pay raises occur in line with FY 2014 Green Book estimates. In this case, given historical hiring patterns, nominal costs would increase by over 15 percent, to $30 billion (for DoD) and $31.8 billion (for the federal government as a whole). This rise is somewhat higher than the projected 10-percent increase in personnel because it also includes the assumed pay raise factors. A hiring rate equal to 75 percent of the historical rate would result in a nominal cost increase of 5 percent, essentially reflecting only the assumed pay raises.

In the scenario in which GTO targets are met, the 3.5 percent reduction in workforce size (to meet a target of approximately 259,000 by FY 2017) is approximately offset by the increase in pay, so that the projected cost to DoD in FY 2017 ($26.0 billion) is nearly the same as the cost in FY 2013 ($25.7 billion). A workforce of 240,000 in FY 2017 can be achieved either by reducing hiring to 50 percent of historical rates or by targeted hiring to meet this workforce size. These two approaches would reduce costs relative to FY 2013 levels by about $1.3 billion (5 percent) and 1.6 billion (6 percent), respectively. Similarly, a workforce of 220,000 in FY 2017 would reduce cost by nearly 15 percent relative to FY 2013 levels.

As we discussed in Chapter Two, managers are not likely to have control over the pay grade structure under a hiring freeze. We estimate that, with a hiring freeze, the projected workforce of 195,000 in FY 2017 would cost DoD $20.7 billion and the government $21.9 billion. This yields per-employee costs of approximately $106,000 and $112,000 for DoD and the government, respectively, approximately 5 percent higher than the FY 2013 per-employee cost. On one hand, we would expect average per-employee costs to fall because retirement-eligible employees are concentrated in higher grades. On the other hand, employees move up through pay steps within a pay grade, thus increasing the per-employee pay in each grade. In addition, new hires are often concentrated in lower grades, so the lack of new hires raises average, per-employee costs. Nonetheless, total cost would be 20 percent lower than in FY 2013. Meeting a workforce size of 200,000 by targeting cuts in proportion to the GTO model require-

**Table 5.1**
**Summary of Projected Civilian Personnel Costs (nominal)**

| | Approximate Workforce Size (000s) | Pay Grade Structure June 2013, Pay Raises from FY 2014 Green Book ($B)) | | Pay Grade Structure June 2013, Pay Raise Freeze ($B) | | Pay Grade Structure Resulting from Hiring and Promotion Freeze, Pay Raises from FY 2014 Green Book ($B) | |
|---|---|---|---|---|---|---|---|
| | | DoD | Govt | DoD | Govt | DoD | Govt |
| Cost in FY 2013 | 268 | 25.7 | 27.5 | N/A | N/A | N/A | N/A |
| Projected Cost in FY 2017 | | | | | | | N/A |
| Historical Hiring | 297 | 30.0 | 31.8 | 28.9 | 30.6 | N/A | N/A |
| 75% of Historical Hiring | 267 | 27.1 | 28.7 | 26.0 | 27.6 | N/A | N/A |
| 50% of Historical Hiring | 240 | 24.4 | 25.9 | 23.5 | 24.9 | N/A | N/A |
| 25% of Historical Hiring | 217 | 22.0 | 23.4 | 21.1 | 22.5 | N/A | N/A |
| Hiring Freeze | 195 | N/A | N/A | N/A | N/A | 20.7 | 21.9 |
| Hiring to Meet Projected Authorizations from GTO Model | 259 | 26.0 | 27.7 | 25.0 | 26.6 | N/A | N/A |
| Hiring to Meet 240,000 End Strength | 240 | 24.1 | 25.7 | 23.2 | 24.7 | N/A | N/A |
| Hiring to Meet 220,000 End Strength | 220 | 22.1 | 23.5 | 21.3 | 22.6 | N/A | N/A |
| Hiring to Meet 200,000 End Strength | 200 | 20.1 | 21.4 | 19.3 | 20.6 | N/A | N/A |

SOURCE: Authors' calculations based on DMDC data, the results of RIM and GTO, and the cost factors discussed in the text.

ments would result in a similar workforce size and total cost as a hiring freeze. However, the composition of the workforce would be different, by command and occupation, as well as by pay grade.

Even though costs are largely driven by the total number of personnel, it may be possible to use pay or workforce management practices to reduce costs for a given number of personnel. Our second cost scenario—which assumes that pay grade structure remains stable but that there are no pay raises within a particular pay grade and pay step—would yield an estimated cost savings of approximately $1 billion relative to the baseline cost scenario with pay raises. For example, under the GTO target scenario, the projected cost to DoD with pay raises is $26 billion in FY 2017, while the projected cost without pay raises is approximately $25 billion. As discussed in Chapter Two, we investigated a third cost scenario that allows pay raises but assumes that managers will reduce promotions and modify hiring such that the pay grade structure returns to its FY 2005 structure. Doing so yields very similar cost outcomes to those of the second cost scenario and is likely less feasible to achieve; therefore, results are not shown.

## Cost of a Reduction in Force

The scenarios that seek to meet certain targets require reductions in addition to those that would be anticipated based on historical separation rates. Table 5.2 presents the approximate cost of severance pay for these reductions, using the method described in Chapter Two. Costs are shown in billions of dollars, to facilitate comparison with the overall workforce costs shown in Table 5.1. These costs capture the direct payments required for any RIFs; they do not capture qualitative factors, such as potential effects on morale or future retention rates.

**Table 5.2**
**Estimated Cost of Reduction in Force for Various Target Scenarios**

| Scenario | Estimated Number of Additional Reductions | Estimated Cost of Associated Reduction in Force ($B nominal) |
|---|---|---|
| Hiring to Meet Projected Authorizations from GTO Model | 1,582 | 0.075 |
| Hiring to Meet 240,000 End Strength | 2,136 | 0.10 |
| Hiring to Meet 220,000 End Strength | 3,089 | 0.15 |
| Hiring to Meet 200,000 End Strength | 8,686 | 0.43 |

NOTE: Estimated number of reductions represents the sum of reductions across the period from end of FY 2013 to end of FY 2017. Estimated costs are the sum across these four years in billions of nominal dollars.

If the workforce is sized to meet GTO targets (approximately 259,000 civilians by FY 2017), approximately 1,600 reductions will be required, with an estimated cost of $75 million, or less than 0.5 percent of the FY 2017 workforce cost under this scenario. The cost increases as lower targets are met. A workforce of 200,000 civilians would require nearly 8,700 reductions, with an associated cost of $430 million (2 percent of FY 2017 workforce cost under this scenario).

These estimates assume that all civilian reductions in excess of projected separations will require severance pay. However, as we discussed above, even the lowest target scenario requires some new hires in most commands and occupations. Additional reductions are projected to meet the workforce within each command and occupation. Therefore, the number of reductions, and the associated cost, may be mitigated if some civilians can be transferred to different occupations or commands. This type of transfer will be highly dependent on the similarity of required skills, as well as on the individual's skills and desires. Alternatively, as shown in Figure 5.4, a large share of projected reductions is in two commands—Acquisition Support and Network Enterprise Technology—that have experienced high switch-in rates. If transfers into these commands are lower going forward, the number of required reductions may be lower.

## Concluding Remarks

Overall, the analysis presented in this report indicates that, to meet future targets, hiring rates will have to be reduced relative to historical levels. However, substantial hiring will still be needed in most commands, and the level of required hiring will vary both across commands and across occupations within a command. A few commands, such as Acquisition Support and Network Enterprise Technology, may require active cuts to personnel, although such reductions may be mitigated if internal transfer rates in the next several years are lower than the high rates these commands have witnessed recently. If substantial cuts are sought (to meet a workforce size on the order of 200,000 civilians by FY 2017), additional commands may also require RIFs. Nonetheless, any projected RIFs are small compared to overall projected separations, and most commands and occupations will require some new hires to make up for the expected separations under most scenarios.

The scenarios shown in this report were selected to provide a range of estimates that may be helpful to Army managers as they plan for a reduction in the overall size of the Army civilian workforce, focusing on changing new-hire rates. RIM can also be used to yield insights about the likely effects of other changes on force size and structure. For example, the size and structure of the workforce under a variety of voluntary separation rates can be explored. Similarly, the model might be extended to allow separation rates to vary by demographic characteristics of personnel or with macroeconomic conditions.

The cost of the workforce will largely change in line with the number of person-nel. If GTO targets are met by FY 2017, nominal costs should remain approximately constant, with expected civilian pay raises offsetting workforce size reductions. Costs could be further reduced by approximately $1 billion by continued pay freezes or by limiting promotions and focusing new hires on relatively low pay grades. However, these strategies should be carefully examined because limiting pay raise or promotion opportunities for existing personnel may increase the probability that the best candi-dates choose to leave the Army in search of opportunities in the private sector.

# RAND Inventory Model Details

Figure A.1 demonstrates the basic procedure RIM uses to project the one-year change in workforce size for employees in a command by occupation with a given YORE. In this figure, there are $I$ employees in the command by occupation, with $A$ employees with a given YORE (YORE $X$) in FY 2013. During FY 2014, the following changes are made:

- The cohort of employees with YORE $X$ is "aged" by one year, to move to YORE $X + 1$.
- The separation rate ($a$) for employees with YORE $X$ is used to project the number of employees in YORE $X$ who leave the civilian Army workforce altogether ($aA$).

**Figure A.1**
**Overview of the RAND Inventory Model**



**RAND** *RR576-A.1*
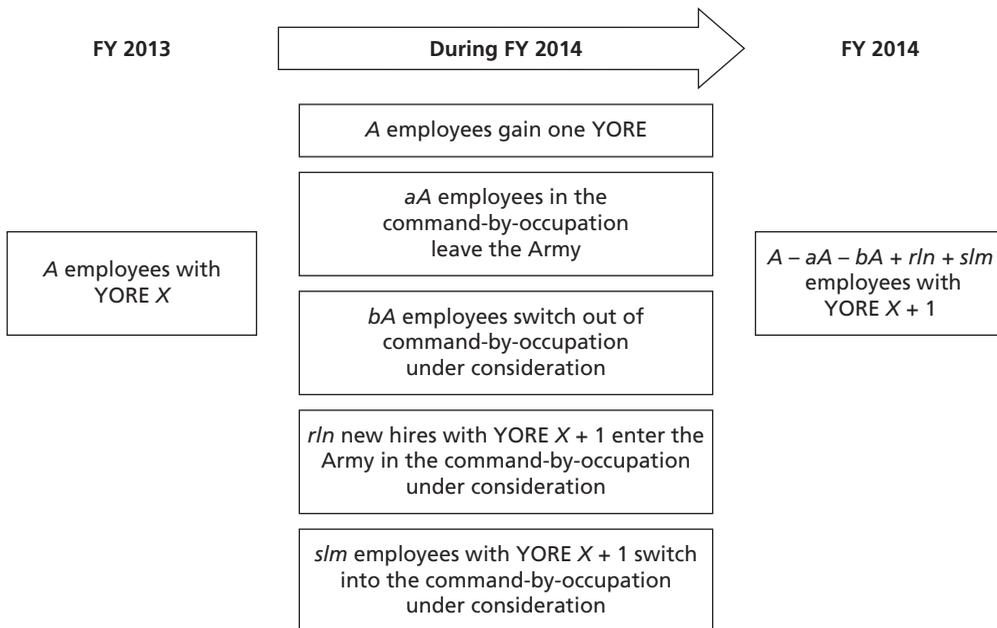
- The switch-out rate ($b$) for employees in YORE $X$ is used to project the number of employees with YORE $X$ who move out of the command by occupation but remain within the civilian Army workforce ($bA$).
- The overall new-hire rate ($r$) across the entire command by occupation times the size of the command by occupation ($I$) gives us the total number of new hires in the command by occupation ($rI$). We multiply this total number of new hires by the fraction of new hires who enter with YORE $X + 1$ ($n$) to project the number of employees with YORE $X + 1$ who enter the command by occupation ($rIn$).
- The overall switch-in rate ($s$) across the entire command by occupation times the size of the command by occupation ($I$) gives us the total number of switches into the command by occupation ($sI$). We multiply this total number of switches in by the fraction of switches in who enter with YORE $X + 1$ ($m$) to project the number of employees with YORE $X + 1$ who enter the command by occupation ($sIm$).

In FY 2014, the size of the workforce in the population of interest in YORE $X + 1$ is thus given by the previous size of the population in YORE $X$ ($A$), minus separations ($aA$), minus switches out ($bA$), plus new hires ($rIn$), plus switches in ($sIm$).

# Cost Projection Details

We calculated the direct cost of full-time civilian personnel, by pay plan and pay grade, for each of the five major pay plans: GS, SES, and the three main FWS plans (WG, WL, and WS), which together made up 87 percent of the Army civilian workforce at the end of FY 2012. Following DoDI 7041.04 (2013), we added up each of the cost elements described in the following sections.[1] Unless described below, we followed guidance from DoDI 7041.04 in estimating each cost element.

- *Base pay, locality pay, cost of living allowance, and Title 38 special salary rates.* OPM publishes national pay tables for GS and SES employees. In addition, GS employees in certain locations receive locality pay adjustments to account for higher costs of living. For FWS employees, wages are set based on the "prevailing wage," which is based on private-sector salary surveys and varies by location. We used the actual pay reported in the DCPDS system to calculate average base pay by pay plan and pay grade, for full-time Army civilians in 2012.

   For GS and SES employees, we confirmed that our estimated average base pay for each grade fell within OPM's published range of 2012 base pay for that grade. For GS employees, we then inflated base pay using the average rate of locality pay across all employees (19.85 percent) reported in 2011 (President's Pay Agent, 2012).

- *OC11 load factor.* This cost element accounts for a variety of special pays, including overtime pay, holiday pay, and incentive pay. We took the load factor from Office of the Under Secretary of Defense (Comptroller) (OUSD), 2013b. We used a load factor of 5.5 percent, which was provided in column (o) of the table entitled "Total Civilian Personnel Costs," for FY 2013. To estimate special pay costs, we multiplied base pay (including locality pay for GS employees) by 5.5 percent.[2]

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[1]  We did not include one civilian cost element—discount groceries—because these are relevant only for civilians outside the continental United States.

[2]  Table 3 of DoDI 7041.04 guidance suggests that the OC11, OC12, and OC13 load factors are a percentage of base pay. However, the example given in Enclosure 6 of this guidance indicates that the load factors are multiplied by base pay *plus* locality pay, so we have followed this example in creating our estimates.

- *OC12 load factor.* This cost element covers fringe benefits. We took the load factor to be equal to the "Funded Benefits Rate" of 30.6 percent for the Army, based on an OUSD memorandum covering civilian personnel fringe benefit rates (OUSD, 2012).[3] For FERS and CSRS employees, we multiplied base pay (including locality pay for GS employees) by this load factor.

    The OUSD memo does not provide a separate fringe benefit rate for temporary (non-FERS, non-CSRS) employees. Instead, we estimated the fringe benefits for these employees based on OMB Circular A-76, which provides instructions on competition for commercial activities. We assumed that employees covered by retirement plans other than FERS and CSRS would incur a Federal Insurance Contributions Act OASDI cost factor of 6.2 percent, up to the first $113,700 of salary, and a Medicare cost factor of 1.45 percent (OMB, 2003).[4]

- *OC13 load factor.* This cost element covers severance pays, and related incentives and health benefits. We took the load factor from OUSD, 2013b. Following DoDI 7041.04 guidance, we started with the value in column (p), which was 32.2 percent for FY 2013, and subtracted out the OC12 load factor of 30.6 percent, to arrive at a value of 1.6 percent. We multiplied base pay (including locality pay for GS employees) by this load factor.

- *Training.* We estimated this cost element by dividing the amount budgeted for civilian education and training in the Army ($212,477,000 for FY 2013, taken from OUSD, 2013c), by the number of Army civilian U.S. direct hires (259,531 for FY 2013, taken from OUSD, 2013b, Civilian Personnel table). This yielded an estimate of $819 per employee.

- *Postretirement health benefit (government's share of Federal Employees Health Benefits [FEHB] Program).* We estimated this cost element by dividing government payments for annuitants under the FEHB Program ($11,027 million in FY 2013, taken from OPM, 2012 [Government Payment for Annuitants, Employees Health Benefits, Program and Financing, Total New Obligations, object class 13.0]) by the number of FEHB annuitants (1,901,000 for FY 2013, from the same document). This provided an estimated cost of $5,801 per employee.

- *Postretirement life insurance.* We estimated this cost element by dividing government payments for life insurance ($45 million for FY 2013, taken from OPM, 2012 [Government Payment for Annuitants, Employee Life Insurance, Program and Financing, Total New Obligations, object class 25.2] by the number of FEHB

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[3]  DoDI 7041.04 (2013) indicates that the "Overall" rate should be used; however, since our analysis is specific to the Army, we used the Army rate. In any case, the Overall rate (30.4 percent) is very close to the Army rate (30.6 percent).

[4]  We updated the salary limit applicable to the OASDI based on the limit published on the Social Security Administration website as of April 2013.

annuitants[5] (1,901,000 for FY 2013, from the same document). This provided an estimated cost of $24 per employee.

- *Unfunded civilian retirement.* This cost element covers the unfunded part of the CSRS retirement plan. We estimated this cost element by dividing payments to the Civil Service Retirement and Disability Fund ($31,876 million for FY 2013, taken from OPM, 2012 [Trust Fund—Civil Service Retirement & Disability Fund, Status of Funds, General Fund Payment to the Civil Service Retirement and Disability Fund]) by the sum of full-time equivalent civilians (811,309 for FY 2013, taken from column [c] of the Total Civilian Personnel Costs table in OUSD [2013b]), plus the number of FEHB annuitants (1,901,000 for FY 2013, from OPM, 2012 [Government Payment for Annuitants, Employees Health Benefits, Program and Financing]). This yielded an estimate of $11,752 per CSRS employee.

We added up these cost elements for different types of employees, as shown in Table B.1. We also distinguished between the costs DoD (the Army) bears and the costs the U.S. government as a whole bears. In particular, the full cost of a FERS or CSRS employee to DoD is equal to base and locality pay; plus the OC11, OC12, and OC13 load factors; plus training costs. The full cost to the U.S. government is equal to

**Table B.1**
**Cost Elements Included for Different Estimates**

| Cost Element | Cost to Army: CSRS or FERS Employee | Cost to Government: CSRS Employee | Cost to Government: FERS Employee | Included in Cost of Temporary Employee (to both Army and government) |
|---|---|---|---|---|
| Base Pay / Locality Pay | X | X | X | X |
| OC11 Load Factor | X | X | X | X |
| OC12 Load Factor | X | X | X | |
| FICA/OASDI Load Factor | | | | X |
| OC13 Load Factor | X | X | X | |
| Training | X | X | X | |
| Postretirement Health Benefit | | X | X | |
| Postretirement Life Benefit | | X | X | |
| Unfunded Civilian Retirement | | X | | |

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[5]  Following DoDI 7041.04 guidance, we assumed that the number of FEHB annuitants was a reasonable proxy for Federal Employees Group Life Insurance annuitants.

the cost to DoD, plus the cost of postretirement health and life insurance benefits, plus unfunded civilian retirement (for CSRS employees). Tables B.2 through B.5 show average pay estimated using the above calculations, by pay plan and pay grade. Table B.6 shows the average costs associated with a RIF, as discussed in Chapter Five.

**Table B.2**
**Average Cost of GS and SES Civilian Employees (FY 2012)**

| Pay Plan and Grade | Cost to DoD ($) | CSRS Cost to Government ($) | FERS Cost to Government ($) | Temporary Employee Cost ($) |
|---|---|---|---|---|
| GS-01 | 30,200 | 47,777 | 36,025 | 24,143 |
| GS-02 | 35,481 | 53,058 | 41,306 | 28,482 |
| GS-03 | 40,691 | 58,268 | 46,516 | 32,763 |
| GS-04 | 47,020 | 64,597 | 52,845 | 37,964 |
| GS-05 | 53,344 | 70,921 | 59,169 | 43,161 |
| GS-06 | 58,521 | 76,098 | 64,346 | 47,415 |
| GS-07 | 65,558 | 83,135 | 71,383 | 53,197 |
| GS-08 | 73,353 | 90,930 | 79,178 | 59,602 |
| GS-09 | 79,302 | 96,879 | 85,127 | 64,491 |
| GS-10 | 90,990 | 108,567 | 96,815 | 74,095 |
| GS-11 | 96,268 | 113,845 | 102,093 | 78,432 |
| GS-12 | 117,834 | 135,411 | 123,659 | 96,153 |
| GS-13 | 141,923 | 159,500 | 147,748 | 115,947 |
| GS-14 | 173,350 | 190,927 | 179,175 | 141,052 |
| GS-15 | 211,060 | 228,637 | 216,885 | 170,341 |
| SES | 225,226 | 242,803 | 231,051 | 181,344 |

SOURCE: Authors' calculations based on DMDC data and fringe cost factors discussed in the text.

**Table B.3**
**Average Cost of WG Civilian Employees (FY 2012)**

| Pay Plan and Grade | Cost to DoD ($) | CSRS Cost to Government ($) | FERS Cost to Government ($) | Temporary Employee Cost ($) |
|---|---|---|---|---|
| WG-01 | 34,732 | 52,309 | 40,557 | 27,867 |
| WG-02 | 41,810 | 59,387 | 47,635 | 33,682 |
| WG-03 | 46,932 | 64,509 | 52,757 | 37,892 |
| WG-04 | 48,732 | 66,309 | 54,557 | 39,371 |
| WG-05 | 55,790 | 73,367 | 61,615 | 45,171 |
| WG-06 | 58,723 | 76,300 | 64,548 | 47,581 |
| WG-07 | 64,111 | 81,688 | 69,936 | 52,008 |
| WG-08 | 65,570 | 83,147 | 71,395 | 53,207 |
| WG-09 | 70,353 | 87,930 | 76,178 | 57,137 |
| WG-10 | 74,948 | 92,525 | 80,773 | 60,913 |
| WG-11 | 79,013 | 96,590 | 84,838 | 64,253 |
| WG-12 | 82,719 | 100,296 | 88,544 | 67,298 |
| WG-13 | 85,612 | 103,189 | 91,437 | 69,676 |
| WG-14 | 89,914 | 107,491 | 95,739 | 73,210 |
| WG-15 | 84,532 | 102,109 | 90,357 | 68,788 |

SOURCE: Authors' calculations based on DMDC data and fringe cost factors discussed in the text.

**Table B.4**
**Average Cost of WL Civilian Employees (FY 2012)**

| Pay Plan and Grade | Cost to DoD ($) | CSRS Cost to Government ($) | FERS Cost to Government ($) | Temporary Employee Cost ($) |
|---|---|---|---|---|
| WL-02 | 47,688 | 65,265 | 53,513 | 38,513 |
| WL-03 | 53,229 | 70,806 | 59,054 | 43,066 |
| WL-04 | 50,065 | 67,642 | 55,890 | 40,466 |
| WL-05 | 61,780 | 79,357 | 67,605 | 50,093 |
| WL-06 | 64,642 | 82,219 | 70,467 | 52,444 |
| WL-07 | 69,635 | 87,212 | 75,460 | 56,547 |
| WL-08 | 73,967 | 91,544 | 79,792 | 60,106 |
| WL-09 | 77,738 | 95,315 | 83,563 | 63,206 |
| WL-10 | 83,184 | 100,761 | 89,009 | 67,681 |
| WL-11 | 83,490 | 101,067 | 89,315 | 67,932 |
| WL-12 | 85,762 | 103,339 | 91,587 | 69,799 |
| WL-13 | 88,979 | 106,556 | 94,804 | 72,442 |
| WL-14 | 103,501 | 121,078 | 109,326 | 84,375 |

SOURCE: Authors' calculations based on DMDC data and fringe cost factors discussed in the text.

NOTE: WL-01 is not included because no Army civilians were found in this pay plan and grade in the end-of-FY-2012 DMDC data.

**Table B.5**
**Average Cost of WS Civilian Employees (FY 2012)**

| Pay Plan and Grade | Cost to DoD ($) | CSRS Cost to Government ($) | FERS Cost to Government ($) | Temporary Employee Cost ($) |
|---|---|---|---|---|
| WS-01 | 59,493 | 77,070 | 65,318 | 48,213 |
| WS-02 | 64,005 | 81,582 | 69,830 | 51,921 |
| WS-03 | 68,153 | 85,730 | 73,978 | 55,329 |
| WS-04 | 69,710 | 87,287 | 75,535 | 56,609 |
| WS-05 | 78,304 | 95,881 | 84,129 | 63,671 |
| WS-06 | 81,627 | 99,204 | 87,452 | 66,401 |
| WS-07 | 83,508 | 101,085 | 89,333 | 67,947 |
| WS-08 | 87,483 | 105,060 | 93,308 | 71,213 |
| WS-09 | 92,728 | 110,305 | 98,553 | 75,523 |
| WS-10 | 97,119 | 114,697 | 102,945 | 79,131 |
| WS-11 | 99,653 | 117,230 | 105,478 | 81,213 |
| WS-12 | 100,803 | 118,380 | 106,628 | 82,158 |
| WS-13 | 105,702 | 123,279 | 111,527 | 86,184 |
| WS-14 | 110,185 | 127,762 | 116,010 | 89,867 |
| WS-15 | 113,788 | 131,365 | 119,613 | 92,828 |
| WS-16 | 120,592 | 138,169 | 126,417 | 98,419 |
| WS-17 | 123,236 | 140,813 | 129,061 | 100,592 |
| WS-18 | 131,410 | 148,987 | 137,235 | 107,308 |
| WS-19 | 138,100 | 155,677 | 143,925 | 112,806 |

SOURCE: Authors' calculations based on DMDC data and fringe cost factors discussed in the text.

**Table B.6**
**Average Severance and Health Care Costs for a Reduction in Force**

| YORE | Average Pay (FY 2012, $) | Estimated Severance Pay ($) | Estimated Health Benefit ($) | Total Per–Employee Cost ($) |
|---|---|---|---|---|
| –21 or less | 58,536 | 6,732 | 5,971 | 12,702 |
| –20 to –11 | 65,977 | 18,336 | 6,730 | 25,065 |
| –10 to –6 | 72,141 | 59,455 | 7,358 | 66,814 |
| –5 to –1 | 74,353 | 74,353 | 7,584 | 81,937 |
| 0 to 4 | 75,056 | 75,056 | 7,656 | 82,712 |
| 5 or more | 75,570 | 75,570 | 7,708 | 83,278 |

SOURCE: Authors' calculations based on DMDC data and cost factors discussed in the text.

NOTE: Estimated per-employee cost of severance pay and 18 months of continued health benefits associated with a reduction in force, by YORE. Costs are based on FY 2012 pay.

# Mission-Critical Occupations

This appendix provides a detailed list of Army MCOs. The occupation codes and names are consistent with those published by OPM (2009). For each MCO, we provide the estimated average separation, switch-out, new-hire, and switch-in rates over the five-year period from FY 2008 to FY 2012, as well as the share of employees at or near (within five years of) retirement eligibility. Total loss rates are the sums of separations plus switches out; total gain rates are the sums of new hires plus switches in. The average number of employees in the MCO is based on the base period size corresponding to each of the five years for which we considered flows (thus, from the end of FY 2007 through the end of FY 2011).

The last two columns in Table C.1 identify the *implied net gains*, equal to the average population multiplied by the net gain rate (average gain rate minus average loss rate) and the *implied steady state populations*, which represent average annual accession counts multiplied by the average annual attrition rates (Keating et al., 2010).

**Table C.1**
**Five-Year Average Employee Flow and Retirement Eligibility Rates in Mission-Critical Occupations, FY 2008–FY 2012**

| Occupation | | Average Number of Employees | Separation Rate (%) | Switch-Out Rate (%) | Total Loss Rate (%) | New-Hire Rate (%) | Switch-In Rate (%) | Total Gain Rate (%) | Share of Employees Eligible for Retirement | | | Implied Net Gains | Implied Steady-State Pop. |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Code | Name | | | | | | | | Now (%) | Within 5 Years (%) | At or Near (%) | | |
| 28 | Env. Protection | 791 | 6 | 9 | 15 | 7 | 8 | 15 | 20 | 22 | 42 | −2 | 779 |
| 83 | Police | 2,797 | 9 | 7 | 16 | 10 | 3 | 13 | 5 | 8 | 13 | −80 | 2,177 |
| 85 | Security Guard | 2,893 | 13 | 7 | 20 | 27 | 2 | 29 | 10 | 12 | 22 | 293 | 4,108 |
| 101 | Social Science | 1,222 | 14 | 7 | 21 | 19 | 11 | 31 | 17 | 20 | 37 | 142 | 1,829 |
| 131 | Int'l. Relations | 46 | 7 | 5 | 13 | 19 | 6 | 24 | 27 | 17 | 44 | 7 | 90 |
| 260 | Eq. Emp. Oppor. | 503 | 9 | 6 | 15 | 6 | 9 | 15 | 25 | 19 | 44 | 0 | 505 |
| 391 | Telecommunications | 949 | 7 | 8 | 15 | 11 | 7 | 17 | 14 | 17 | 31 | 26 | 1,120 |
| 401 | Nat. Res. Mgmt. | 2,920 | 4 | 3 | 7 | 6 | 7 | 12 | 14 | 13 | 27 | 164 | 5,040 |
| 505 | Fin. Mgmt. | 223 | 7 | 13 | 20 | 2 | 17 | 19 | 28 | 23 | 51 | −1 | 216 |
| 601 | Health Sciences | 240 | 7 | 6 | 14 | 19 | 6 | 25 | 10 | 15 | 25 | 36 | 439 |
| 603 | Physician Asst. | 482 | 11 | 2 | 13 | 21 | 1 | 22 | 10 | 18 | 28 | 51 | 814 |
| 620 | Practical Nurse | 2,132 | 13 | 4 | 16 | 27 | 1 | 28 | 5 | 11 | 16 | 338 | 3,663 |
| 621 | Nursing Asst. | 1,221 | 12 | 10 | 21 | 24 | 2 | 26 | 5 | 8 | 14 | 51 | 1,474 |
| 633 | Physical Therapist | 107 | 13 | 6 | 19 | 32 | 1 | 34 | 1 | 9 | 10 | 22 | 194 |
| 640 | Heath Aid | 1,726 | 9 | 11 | 20 | 14 | 6 | 20 | 9 | 13 | 21 | 4 | 1,743 |
| 642 | Nuclear Med. Tech. | 45 | 4 | 1 | 5 | 10 | 0 | 10 | 7 | 21 | 28 | 3 | 95 |
| 647 | Diag. Radiologic Tech. | 477 | 8 | 3 | 10 | 14 | 1 | 15 | 9 | 13 | 22 | 22 | 670 |

**Table C.1—Continued**

| Occupation | | | | | | | | | Share of Employees Eligible for Retirement | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Code | Name | Average Number of Employees | Separation Rate (%) | Switch-Out Rate (%) | Total Loss Rate (%) | New-Hire Rate (%) | Switch-In Rate (%) | Total Gain Rate (%) | Now (%) | Within 5 Years (%) | At or Near (%) | Implied Net Gains | Implied Steady-State Pop. |
| 671 | Health Systems Spec. | 1,195 | 7 | 7 | 14 | 13 | 17 | 30 | 11 | 17 | 28 | 283 | 2,613 |
| 681 | Dental Asst. | 1,203 | 9 | 5 | 14 | 20 | 1 | 21 | 11 | 10 | 21 | 100 | 1,807 |
| 682 | Dental Hygiene | 119 | 10 | 3 | 13 | 18 | 1 | 19 | 10 | 19 | 29 | 8 | 177 |
| 802 | Engineering Tech. | 4,055 | 10 | 6 | 16 | 11 | 6 | 17 | 26 | 19 | 45 | 21 | 4,191 |
| 809 | Construction Control Tech. | 1,299 | 8 | 5 | 14 | 11 | 7 | 18 | 30 | 20 | 50 | 56 | 1,712 |
| 810 | Civil Engineer | 5,851 | 4 | 4 | 8 | 8 | 4 | 12 | 18 | 18 | 36 | 244 | 8,664 |
| 819 | Environmental Engineer | 735 | 4 | 7 | 11 | 6 | 7 | 12 | 14 | 21 | 35 | 8 | 803 |
| 830 | Mechanical Engineer | 3,158 | 3 | 5 | 9 | 8 | 4 | 12 | 10 | 13 | 23 | 113 | 4,395 |
| 850 | Electrical Engineer | 1,052 | 4 | 6 | 10 | 10 | 5 | 14 | 13 | 12 | 25 | 54 | 1,563 |
| 861 | Aerospace Engineer | 673 | 3 | 3 | 7 | 6 | 3 | 9 | 10 | 16 | 26 | 17 | 910 |
| 893 | Chemical Engineer | 441 | 3 | 5 | 7 | 5 | 3 | 8 | 12 | 16 | 28 | 2 | 471 |
| 905 | Attorney | 1,340 | 6 | 2 | 8 | 10 | 2 | 12 | 20 | 19 | 39 | 54 | 1,938 |
| 950 | Paralegal | 431 | 8 | 5 | 13 | 11 | 8 | 19 | 15 | 18 | 33 | 31 | 647 |
| 1035 | Public Affairs | 1,245 | 9 | 5 | 14 | 10 | 6 | 16 | 14 | 15 | 29 | 31 | 1,466 |
| 1040 | Language | 46 | 7 | 7 | 14 | 9 | 2 | 12 | 17 | 24 | 41 | −1 | 39 |
| 1173 | Housing Mgmt. | 488 | 8 | 10 | 18 | 10 | 10 | 20 | 18 | 21 | 38 | 10 | 545 |

**Table C.1—Continued**

| Occupation | | Average Number of Employees | Separation Rate (%) | Switch-Out Rate (%) | Total Loss Rate (%) | New-Hire Rate (%) | Switch-In Rate (%) | Total Gain Rate (%) | Share of Employees Eligible for Retirement | | | Implied Net Gains | Implied Steady-State Pop. |
| Code | Name | | | | | | | | Now (%) | Within 5 Years (%) | At or Near (%) | | |
| 1301 | Physical Science | 1,046 | 5 | 5 | 10 | 6 | 6 | 13 | 20 | 18 | 39 | 33 | 1,376 |
| 1320 | Chemistry | 673 | 5 | 3 | 8 | 7 | 2 | 9 | 19 | 16 | 35 | 4 | 726 |
| 1515 | Operations Research | 1,557 | 5 | 4 | 9 | 6 | 4 | 11 | 17 | 16 | 33 | 20 | 1,771 |
| 1520 | Mathematics | 122 | 6 | 3 | 9 | 6 | 3 | 10 | 24 | 20 | 44 | 1 | 136 |
| 1701 | Education and Training | 2,885 | 7 | 3 | 10 | 10 | 2 | 12 | 16 | 18 | 35 | 68 | 35,42 |
| 1712 | Training Instruction | 3,628 | 8 | 6 | 13 | 15 | 5 | 20 | 10 | 13 | 23 | 301 | 5,619 |
| 1740 | Education Services | 494 | 9 | 4 | 13 | 9 | 6 | 15 | 32 | 17 | 49 | 12 | 583 |
| 1801 | Inspection | 559 | 7 | 4 | 11 | 12 | 7 | 20 | 13 | 16 | 29 | 53 | 955 |
| 2152 | Air Traffic Control | 564 | 5 | 2 | 7 | 7 | 1 | 9 | 7 | 6 | 13 | 13 | 745 |

SOURCE: Authors' calculations based on DMDC data.

NOTE: Average number of employees is based on baseline counts from FY 2007 through FY 2011. Rates are based on flows from FY 2008 through FY 2012. Shares of employees at or near (within five years of) retirement eligibility are averages from FY 2008 through FY 2012.

# Alternative Target Scenarios

This appendix presents key results for the target scenario based directly on the FY 2014 President's Budget, without considering the input-output linkages of the GTO model. Since the results are quite similar to those under the GTO target scenario, only a subset of results is shown.

Figure D.1 shows that, given the FY 2014 President's Budget, the size of the Army civilian workforce is projected to fall to approximately the same level as the one the GTO target scenario projected (nearly 259,000) by FY 2017.

Figures D.2 and D.3 show that, for the ten largest commands and occupations, the required percentage changes in workforce size are similar under the GTO target and budget target scenarios. Both scenarios are compared with the projected percentage changes under historical hiring conditions. Although there are small differences,

**Figure D.1**
**Total Projected Army Civilian Workforce Supply: Meeting Budget Targets**
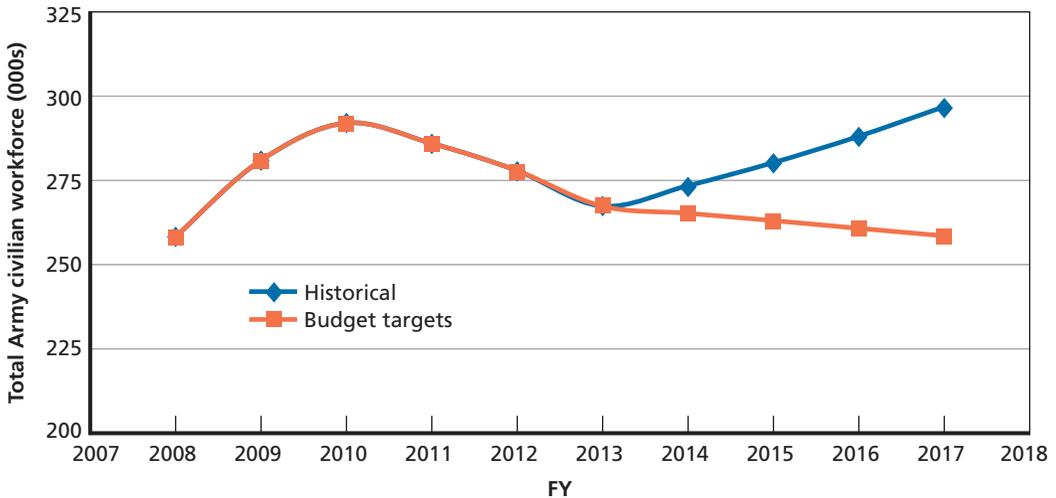


SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.
RAND *RR576-D.1*

**Figure D.2**
**Projected Percentage Changes in Workforce Size from FY 2013 to FY 2017 by Command: Meeting Budget Targets**
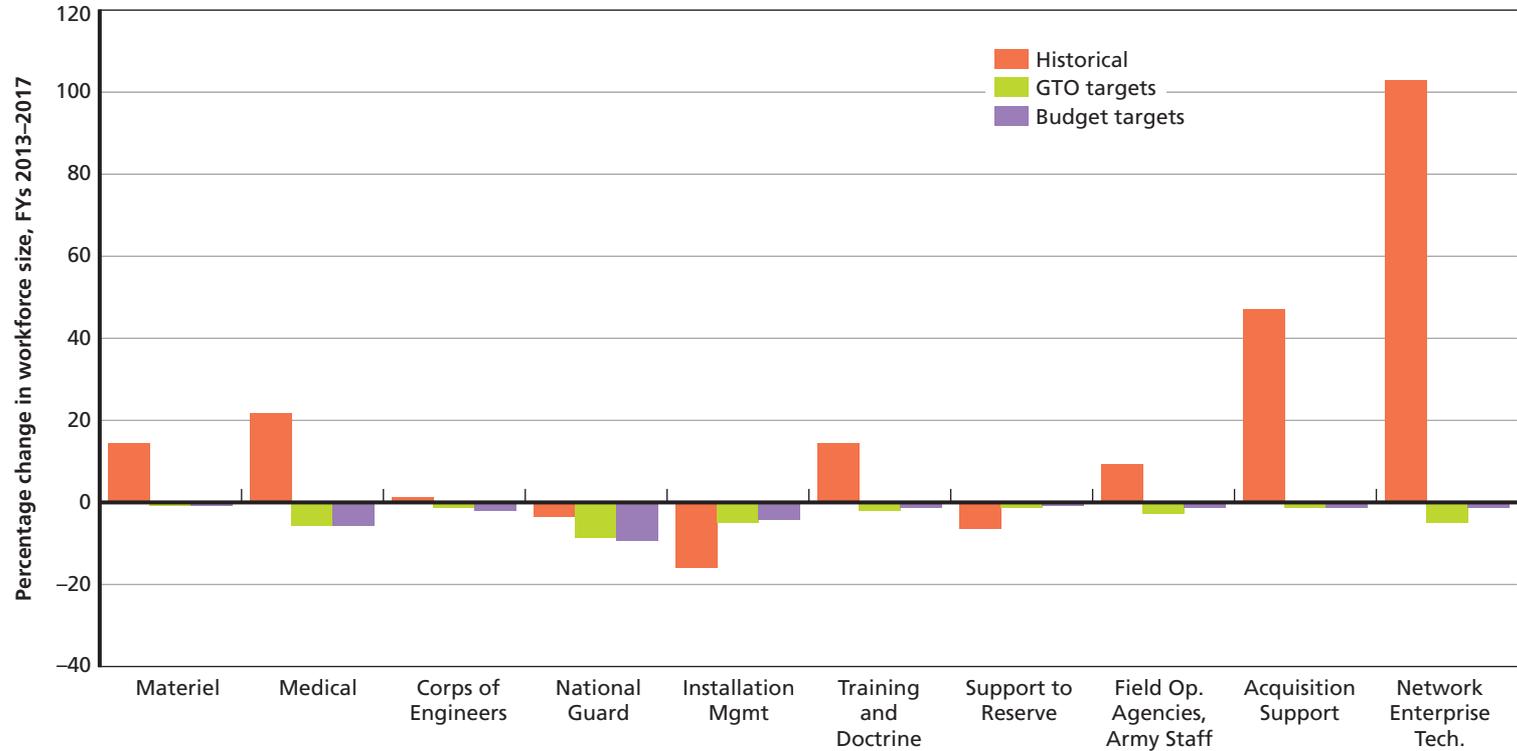


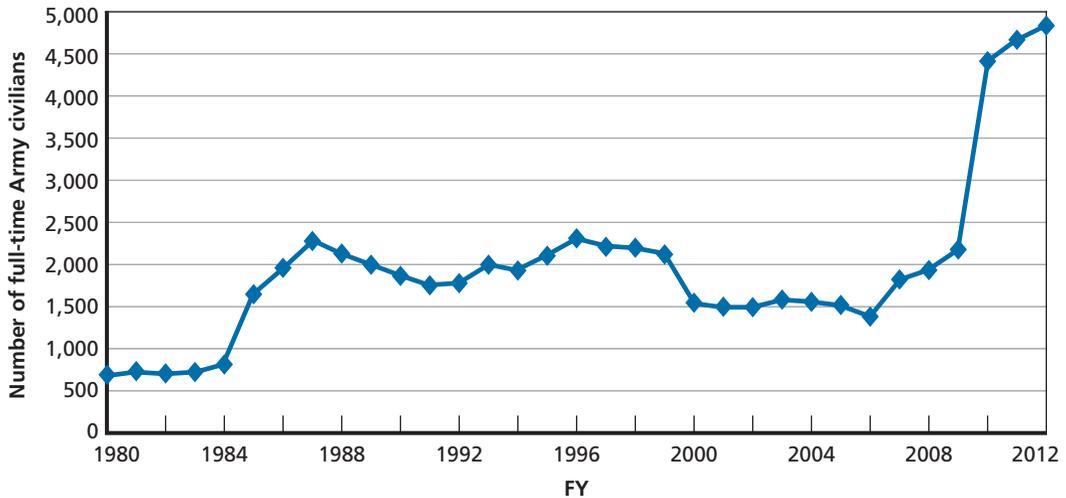SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.

RAND *RR576-D.2*

**Figure D.3**
**Projected Percentage Changes in Workforce Size from FY 2013 to FY 2017 by Occupation: Meeting Budget Targets**
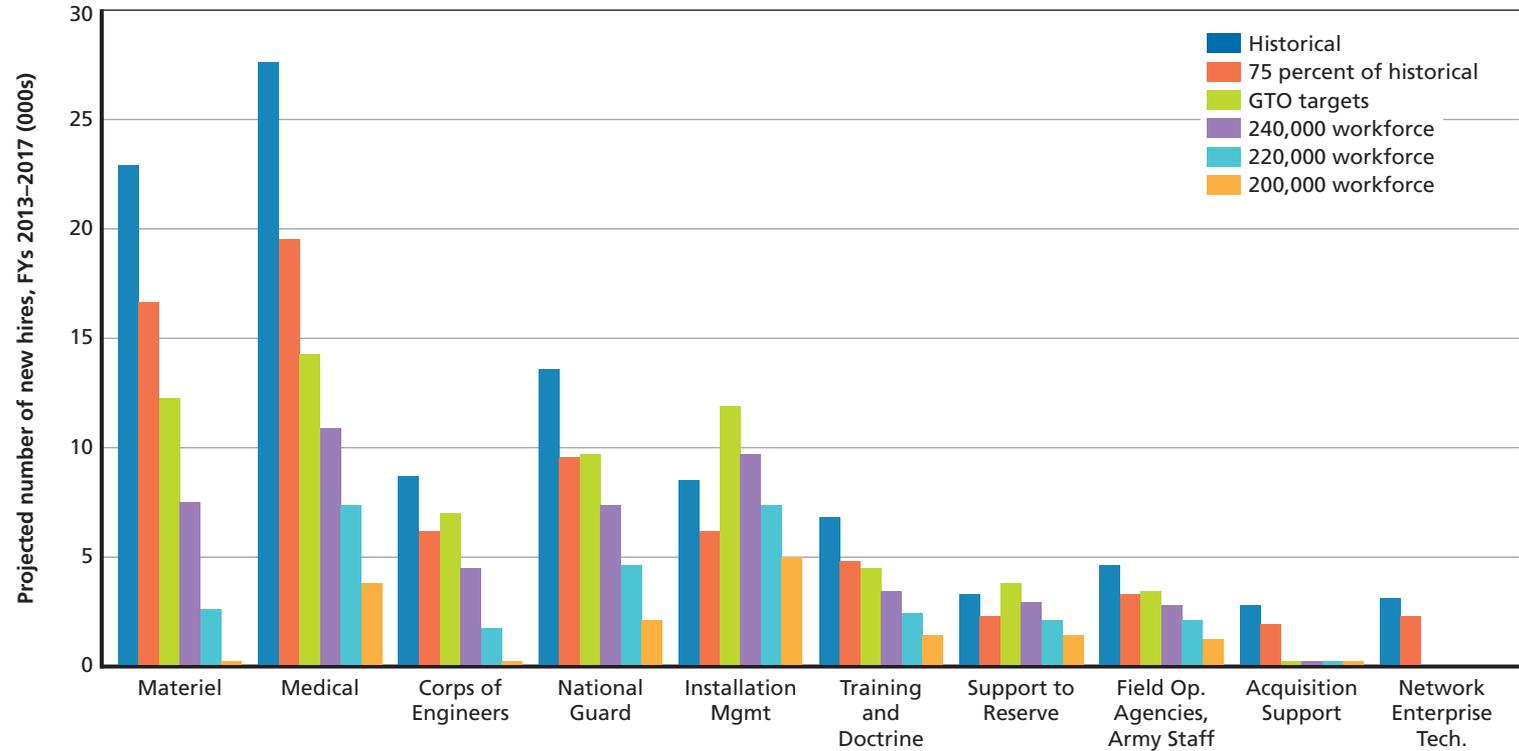


SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.

RAND *RR576-5.3*

meeting the targets under either set of assumptions will require reductions in all the largest commands and occupations.

Figure D.4 shows the total numbers of new hires, separations, and additional reductions under the GTO target and the budget target scenarios. Both scenarios require nearly 75,000 new hires over the four years between FY 2013 and FY 2017. In addition, the bulk of additional reductions come from the Network Enterprise Technology Command, due to the high historical rate of internal transfers into this command.

**Figure D.4**
**Total Projected Numbers of New Hires, Separations, and Additional Reductions from FY 2013 to FY 2017: Meeting Budget Targets**
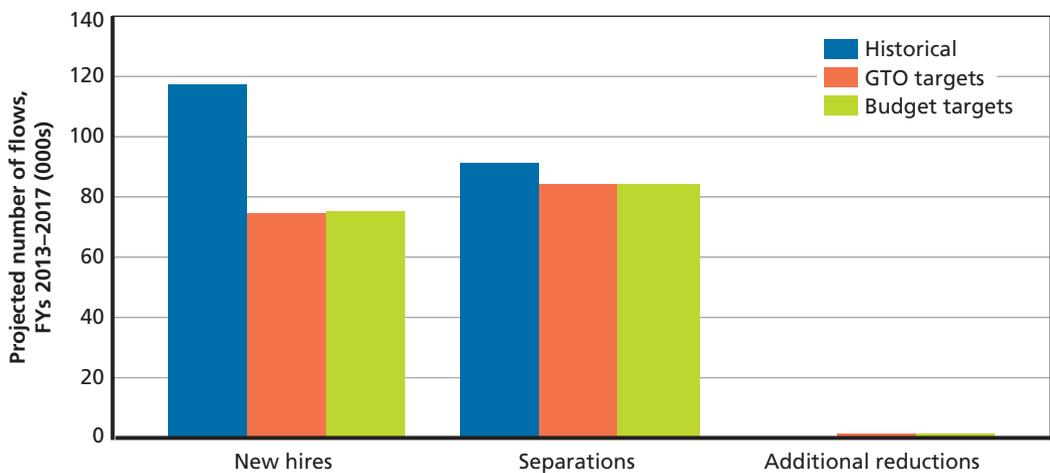


SOURCE: Authors' calculations based on DMDC data and RIM and GTO results.
**RAND** *RR576-D.4*

# Historical Data for Network Enterprise Technology Command

This appendix contains figures showing the historical population and flow rates for the Network Enterprise Technology Command. As discussed in Chapter Four, the high switch-in rate in FY 2010 led to a jump in command size in that year (Figures E.1 and E.2). Since RIM assumes that historical rates will continue into the future, the high switch-in rate in FY 2010 underlies model projections that this command will continue to grow despite a hiring freeze. It may therefore be possible to avoid additional reductions in this command if switches in remain low (or are limited).

**Figure E.1**
**Network Enterprise Technology Command End-of-FY Population, 1980–2012**



SOURCE: Authors' calculations based on DMDC data.
**RAND** *RR576-E.1*

**Figure E.2**
**Gains, Losses, and Net Gains in Network Enterprise Technology Command, 2003–2012**
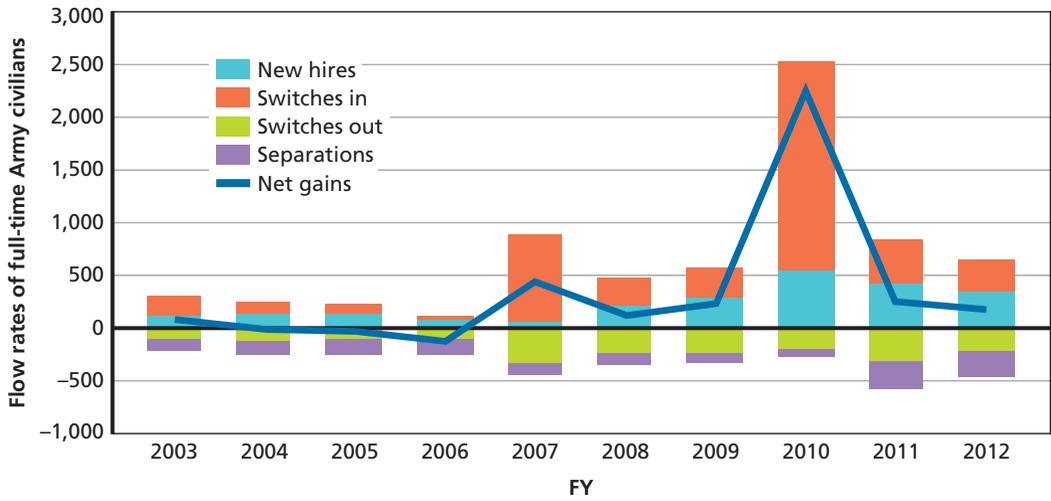


SOURCE: Authors' calculations based on DMDC data.
NOTE: Net gains are calculated as total gains minus total losses.
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In keeping with the coming drawdown in military end strength, the Department of Defense is planning to scale back its civilian workforce over the next several years. After reaching nearly 295,000 full-time employees in fiscal year (FY) 2010, the size of Army's civilian workforce has started to fall. It is necessary to manage this drawdown so that sufficient people remain available in key positions. The authors projected the future supply of Army civilians under various scenarios and examined how the Army might manage supply to meet projected demand, by bringing together workforce supply and demand models. The RAND Inventory Model was used to project the supply of Army civilians, by command and occupation, based on historical patterns of internal transfers and separations, and various scenarios for future hiring. The supply projections were matched with demand projections from RAND's Generating-Force-to-Operator model, which translates budgets for the Army's operating force into projected changes in the institutional Army, to estimate the numbers of new hires or force reductions needed to meet the demand for civilians. The findings suggest that meeting future targets will require reducing hiring rates below historical levels but that substantial hiring will still be needed in most commands. If demand drops considerably below current projections, larger cuts would likely be required. Workforce cost is projected to change largely in line with the number of personnel. If requirements based on the FY 2014 President's Budget are met by FY 2017, nominal costs are projected to remain approximately constant, with expected civilian pay raises offsetting workforce reductions.

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